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the new york city
WATERFRONT

COMPREHENSIVE PLANNING WORKSHOP

Abraham D. Beame, Mayor

CITY OF NEW YORK

THE CITY OF NEW YORK DEPARTMENT OF CITY PLANNING

John E. Zuccotti, Chairman

The New York City Planning Commission

June, 1974

NYC DCP 74-05

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The New York City waterfront, measuring 578 miles[1], has a hundred different uses and wears a hundred different faces. Unlike most underutilized land, it has enormous potential - more than any other type of land anywhere. It is a "natural" for recreation, housing and highways. It is part of the food chain, supporting bird life, fish and other aquatic organisms. It is the only possible location for such facilities as electric generating plants, port installations, shipbuilders, Coast Guard bases, and water pollution control plants. The waterfront is an entity unto itself, more than the sum of its parts.

The Port, largely responsible for the City's rapid commercial rise, continues to contribute significantly to the urban economy, but time and technology have left stranded many once-busy segments of the waterfront. Brickyards, stoneyards, lime kilns, slaughterhouses, and glue factories have either gone out of business or moved elsewhere. Containerization has shifted the volume of shipping business, and airlines and cruises have transformed passenger ship piers. These changes have opened up the waterfront's potential, although in a double-edged fashion: because one type of development usually precludes all the alternatives, proposals may generate counter-proposals. A housing plan is met with the suggestion that a park would be preferable, a plan to site industry may arouse environmentalists, a plan to turn over an idle pier for recreation may be attacked as a blow at shipping.

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[1] As far as from New York City to Charleston, S.C.

Almost everyone agrees that the shoreline is too valuable to be allowed to lie fallow but agreement on a specific plan may be difficult to obtain. This is one of many contradictions enshrouding the waterfront. Others are:

- Almost every segment is part of an existing community - to which the shoreline is either a back yard or a front yard - but it is also a City-wide resource.
- Its past development was very largely industrial and commercial, but in the future, there will be many recreational and residential developments.
- Most of the shoreline is owned by the City but the State has recently declared a temporary moratorium on construction on all tidal wetlands (defined as shorelines affected by tidal actions, which covers the entire City waterfront). All levels of government are now involved in waterfront planning and development and on each level are numerous, sometimes competing agencies. In addition to land use controls, various City agencies now issue 76 different permits for waterfront activities.

Frequently, these contradictions have been resolved. Industries have been located at a distance from residential neighborhoods. The public's longing for water views and promenades has been met by insuring public access to private housing developments or by decking over highways.

Unlikely, even brilliant, marriages have been arranged: the roof of the giant North River Pollution Control plant will be a park, as will the roof of the new Convention Center.

There are several ways in which waterfront development might be controlled: by zoning the entire shoreline, by laying out special districts, by drawing up a comprehensive waterfront plan. Or it might be better, in the light of the waterfront's variety and many potentialities, to shepherd development project by project, section by section.

Under any approach to waterfront planning, provision must be made for retaining job-producing facilities as well as critical natural systems, for protecting upland communities as well as meeting City-wide needs, for utilizing the unique attributes of rivers and harbors without exhausting them. First steps should be to make an inventory of existing uses and to understand the trends taking place within each category. Then it will be possible to establish criteria for future development. This workbook is designed to make a start in that direction.

The waterfront is sketched in terms of its economic uses, residential developments, recreational facilities, transportation modes, institutional structures - and its great potential. The various laws and agencies involved with the waterfront are described. And both the shoreline and uplands are considered from an environmental viewpoint: the state of the waters, the adequacy of pollution control plants and programs, the problems associated with waste disposal.

To ignore the waterfront is to overlook a great and irreplaceable public resource. At once romantic and economically important, the waterfront must be handled with care and precision for it - and the City - to flourish.

Planning issues for the waterfront can be grouped into four categories: land use, governmental responsibility, public access, and environmental quality. Within each category are critical policy alternatives.

LAND USE

1. What criteria should be applied to resolving problems of competing uses for the waterfront?
2. How much weight should be given to factors such as available infrastructure, scale of development, relationship to existing communities, design, and environmental impact?
3. How can provision be made for siting essential but unattractive facilities such as marine transfer stations and pollution control plants?
4. Should jobs and industries along the shore be shielded from pressures for redevelopment?
5. Should waterfront housing be given priority vis-a-vis other housing sites?
6. Should subsidies be channeled toward waterfront housing in order to make them mixed income developments at the expense of urban renewal areas?
7. Should the City finance the costs of the infrastructure, should they be shared with the developer according to a fixed formula, or should they be negotiated case by case?

8. Should the City discourage developments with inadequate access to mass transportation?

GOVERNMENTAL RESPONSIBILITY

1. Should State-established priorities be applied to the City's waterfront or should this be strictly a City responsibility?

2. What level of government should be responsible for the preservation of coastal wetlands and other waterfront land use decisions?

3. What should be the division of responsibility among the Federal, State and local governments?

4. Should the City continue to formulate design controls for specific housing developments on a site by site basis? If so, are additional guidelines needed?

5. Should a special waterfront zoning district be created or should a comprehensive waterfront plan be articulated?

ACCESS

1. Should the City require public access to private developments on a comprehensive basis or should such tools be developed on an area by area basis, as with Manhattan Landing and Battery Park City?

2. Should the City take a more active role in generating waterfront developments with accessible public amenities?

3. Should the burden of building and maintaining public places continue to be borne by developers regardless of the density of development?

4. Should private homeowners in low-density developments be required to pay for the maintenance of public places?

5. Can proper urban designing make competing uses compatible: e.g., public access and industrial use?

6. Should special mixed use zoning be developed for all waterfront areas to insure public access?

7. Should the City encourage development of a waterborne mass transportation system now or wait for further technological advances in the field?

8. Should the City reserve docking and terminal areas for future use?

ENVIRONMENTAL QUALITY

1. How can a proper balance be achieved between water quality and the cost of treatment?

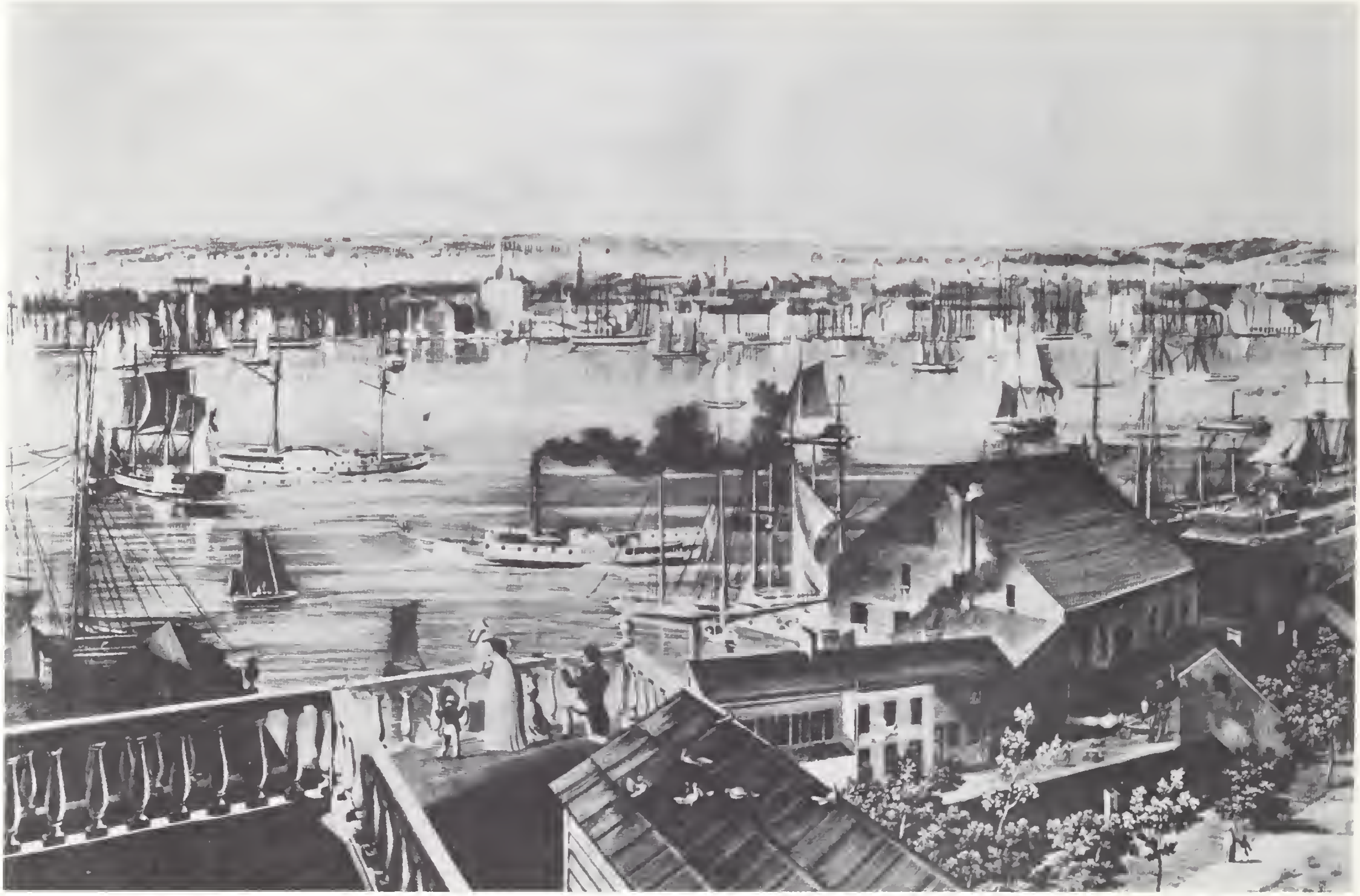
2. Should ocean dumping of all wastes be eliminated regardless of cost?

3. Should all heated water discharges be cooled before entering the waterways?

4. Should water quality have an equal priority with air quality improvements?

- What are the forces which have shaped the uses on the City's waterfront?

- What forces are affecting the waterfront today?



View of the East River from Brooklyn Heights in 1836.

The waterfront has shaped New York City. One of the City's greatest resources, the waterfront has undergone continual change.

New Amsterdam and then New York City grew until it surpassed both Boston and Philadelphia as a port. New York's initial success as a port was due to its natural advantages. After the War of 1812, an influx of British goods made New York City the trading center of the country and provided merchants with the capital to expand their activities. More significant was the decision of the state in 1817 to build the Erie Canal from Albany to Buffalo. The canal made it possible for low-cost bulk goods to be included in the trade between New York and its hinterland. The cost of shipping a ton of wheat from Buffalo to New York City fell from $100 to less than $12 in just two years.

The cotton trade also played a crucial role in New York's rise as a trading center. In 1822, cotton was the City's most valuable domestic import and its chief export. The capital deriving from the cotton trade made New York City the financial center of the United States.

When rival cities built railroads to challenge New York's advantage in domestic trade, New Yorkers built them as well. By 1851, two truck lines spanned the state connecting Lake Erie with the Port of New York. The truck lines did not enter the City directly, but the destination of the freight they carried was the City's busy East River piers.

East River Activities

Shipbuilding, an important industry, was concentrated on the East River. Related industries developed nearby. The economic activity which supported the port gave New York City a hustling and bustling atmosphere that has been associated with its name ever since.

Shipping and port activity had other effects. New York, having the greatest amount of foreign trade, also received the largest number of immigrants. These immigrants became a source of cheap labor for the City's expanding manufacturing and industrial firms. The housing that was built for these immigrants, the Old Law Tenements, still remains in much of New York.

The port's economic activity spilled over outside Manhattan. Commercial waterfront development in Brooklyn was as extensive as in Manhattan. By 1869, Brooklyn had eight miles of piers, dry docks, grain elevators, and warehouses.

Increased use of the shoreline took its toll on the waters of the harbor. In 1875, the Chamber of Commerce was told by port officials that their power was inadequate to prevent "daily depredations upon the waters of this harbor." Garbage dumping and sewage discharges into the rivers were inadequately controlled.

Deteriorated 19th Century Piers

In the early 1870's, railroads first started to carry large amounts of freight directly into Manhattan. As a result, the port experienced an even greater boom. This boom occurred during a period of deterioration in the physical condition of the port. In 1874, harbor officials surveyed the docks, and described only 10 of the 64 publicly owned wharves as in "good" or "fair" condition. The State Legislature created a Department of Docks with extensive powers, but little action was taken on the multitude of problems plaguing the port.

With the introduction of the Hudson, and later the Penn Central, Railroads, Manhattan's shipping activity expanded on the West Side. This coincided with the age of steam and of motor-driven ships. Though less developed than the East Side, the West Side had greater room for shipping and industrial activity. Riverside Park, designed by Frederick Law Olmsted, was laid out in 1886 as a means of halting the northern expansion of finger piers and commercial development. East Side piers, which never had a full-sized industrial area to service, became largely inactive when clipper ships became obsolete.

The Brooklyn waterfront continued to boom. Shipping and shipbuilding generated jobs and spurred extensive industrial development upland. More ships tied up at Brooklyn than at any other place in the port. Development near the Brooklyn shore was not exclusively industrial, however. A Brooklyn realtor, advertising lots in Brooklyn Heights in 1823, described an area "...elevated and perfectly healthy at all seasons, view of water and landscape both extensive and beautiful."

As the waterfront spawned the City's impressive economic growth, it also facilitated the vital transportation links needed to maintain that growth. The use of ferries across New York's waterways grew dramatically from the mid-17th century to the early 20th century. By 1860, more than 25 ferry lines connected the bustling Manhattan economy with workers across the East and Hudson Rivers. Dependence upon the ferries for transportation diminished after the opening of cross-Hudson bridges and tunnels in the decade of 1927-1937.

Seaside Resorts

As the City and its transit system expanded, the resort areas of Queens, Staten Island and Brooklyn became more heavily used. Estates and mansions were converted to beach clubs. When the Coney Island subway was built in 1920, the beaches became accessible playgrounds for lower-income adults and children. They also served as summer colonies.

Increased access made the shoreline much more a part of every New Yorker's life. In 1933, when Robert Moses became City Parks Commissioner, New York had only one mile of eroded shore available for public recreation. When he left his job, the City had 17 miles of well-maintained beaches. Moses created large parks on the waterfront - Jacob Riis Park, Pelham Bay Park, Randall's Island Park, and Orchard Beach.

Shipping and waterfront economic activity increased along the outer edges of the waterfront as well. The Harlem River was the site of coal and fuel depots in the Bronx. In 1921, Mayor John F. Hylan guided the construction of 14 City-owned piers on Staten Island.

The waterfront is still the site of much of the City's economic activity, but the waterfront is no longer exclusively industry's domain. Fishing, always an important New York waterfront activity, has suffered because of the rise in pollution. Shipping has changed drastically as well, as a new technology, containerization, has sprung up which relies on trucks rather than trains for land transport. Development of containerports is currently taking place in various sections of Brooklyn and Staten Island, where upland back-up space is available for containers and trucks.

As the shipping industry decreased in Manhattan, new land uses took its place. Lower Manhattan's waterfront, historically a site of intense shipping activity, is the site of two residential communities, Battery Park City and Manhattan Landing. A strong City role in these developments insures that both communities will provide public access to the Hudson and East River shorelines.

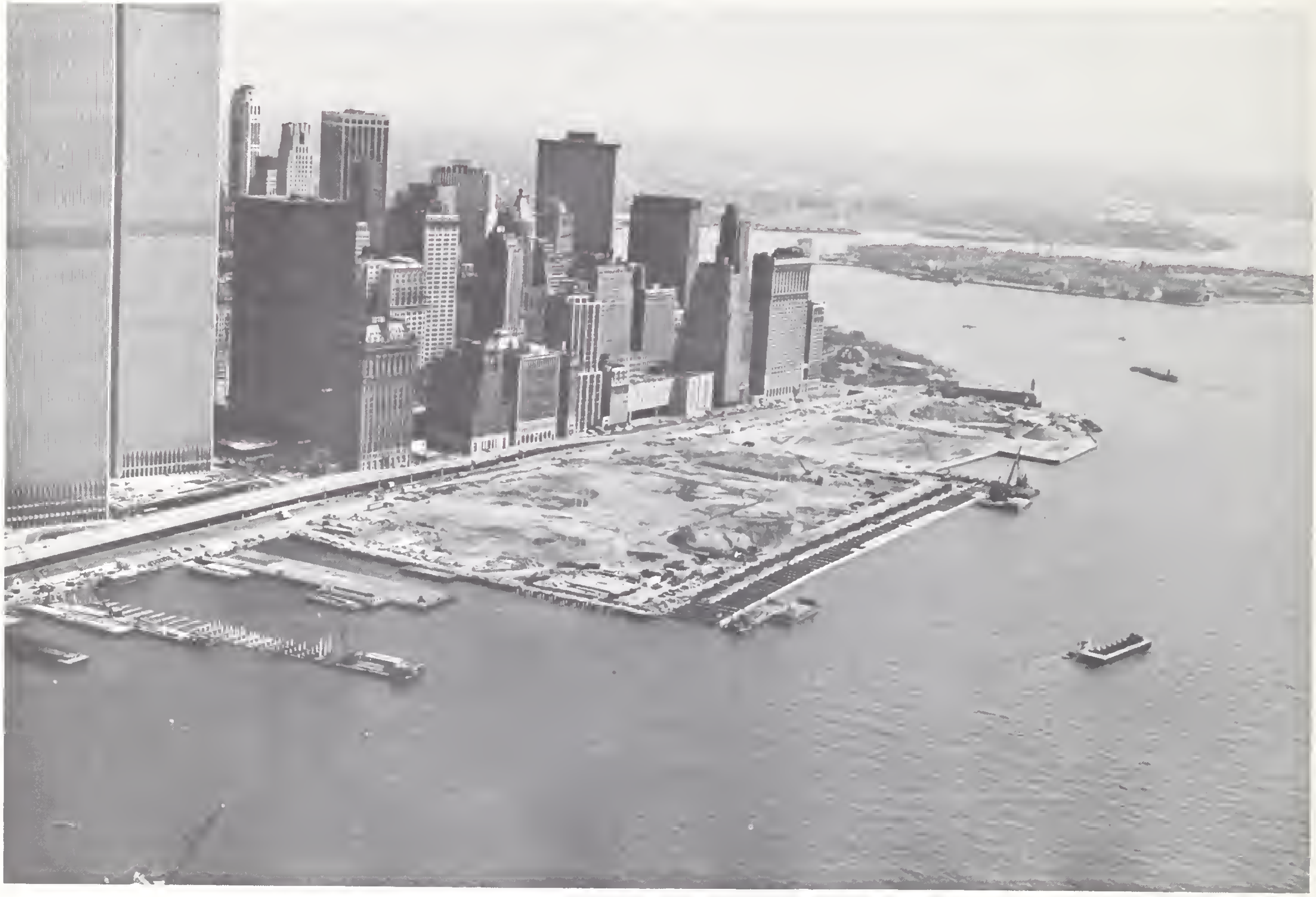
From its first use as a trading post to its current multi-use status, the waterfront has changed with the City. As the City continues to renew itself, so will its waterfront. As much as ever before, the waterfront is New York City's challenge and frontier.

intergovernmental responsibilities

- How do the Federal, State, and City governments share jurisdiction over the waterfront?

- Where do conflicts of responsibility exist?

- What are the emerging roles of the Federal, State, and City governments?



INTERGOVERNMENTAL RESPONSIBILITIES:

Battery Park City, which will be built on landfill in Lower Manhattan, illustrates the various governmental levels involved in waterfront development: Congress issued a declaration of non-navigability, the State established the Battery Park City Authority, and the City created a special zoning district.

Numerous Federal, State, City and regional agencies share jurisdictions and administrative controls over the City's waterways and waterfront in a complicated pattern of overlapping and sometimes competing interests.

Federal waterfront-related programs are carried out under Constitutional provisions which confer powers upon the Federal government, the broadest and most widely exercised of which (Article I, Section 8) gives Congress the power to regulate foreign and interstate commerce. A wide range of Federal laws affects navigation as well as environmental protection.

The State's jurisdiction over waterways and the waterfront rests on its title to, or public trust responsibility for, land under navigable waters as well as its powers relating to intra-state commerce, environmental protection and land-use regulation. Virtually all State laws and regulations governing navigable waterways and adjacent property are embodied in the Environmental Conservation Law, the strongest instrument of State control. It empowers the State to designate wetlands, acquire land, protect waterways, and so on.

New York City, empowered by the State to adopt land-use regulations, is responsible for waterfront zoning. The State has also delegated to the City the power to regulate development in, or adjacent to, navigable waters. In providing for the general welfare, the City is necessarily a major factor in waterfront planning and management. Administering such programs as sewage treatment, waste disposal, health care, economic development, and building regulation, the City applies them to its use and control of areas in, under, along, and upland from the water.

Regional agencies deal with waterfront issues irrespective of local or state boundaries. Regional bodies can be Federally mandated, like the New England River Basins Commission, or voluntary, like the Port Authority.

FEDERAL JURISDICTION

Federal jurisdiction over the waterfront focuses on navigation, environmental conservation, and flood disaster protection. The Federal government has no control over local land use.

The basis for Federal involvement in the waterfront dates back to the framing of the Constitution. At that time, the States delegated to the Federal branch the power to regulate interstate commerce. This traditional delegation of responsibility encompassing navigation has been maintained.

The Rivers and Harbors Act of 1899 serves as the second basis for Federal responsibility. The Act gave to the Corps of Engineers the primary responsibility for regulating navigation. This includes the authority to issue permits for the construction of dams and dikes across waterways, piers, wharves, bulkheads or other structures, and excavation or landfill in navigable waters. The Corps may also establish pierhead and bulkhead lines which limit any work extended into navigable waters.

The Corps of Engineers issues permits for construction, dredging or filling after projects are approved. Approval is based on the effect the project will have on navigability, environmental conservation, and the public interest. Because all the City's waterways are navigable (as defined by law) and thus under Federal jurisdiction, most waterfront construction here requires the Corps' approval.

Despite issuance of permits, the Corps retains the right to remove structures at the owners' expense if they are found to obstruct navigation. Waterfront construction on landfill or platforms is especially vulnerable to this jurisdiction. Title insurance companies have traditionally refused to insure or certify titles for construction extending beyond the bulkhead line without an exception to the Federal right of reclamation.

"Non-Navigability"

To alleviate this problem, Congress legislatively exempts certain waters from navigational servitude by declaring them "non-navigable." It can, however, reserve the right to repeal the declaration at some future date.

Although originally enacted to protect the navigability of the nation's waterways, the Rivers and Harbors Act has recently been interpreted to include environmental conservation. The Supreme Court held that the Corps of Engineers could deny permits for any activities they deemed environmentally unsound, regardless of the effect on navigability. The legislation thus became highly relevant to pollution control. The Federal government has since become increasingly involved in environmental conservation on the waterfront.

The Refuse Act of 1899 made it unlawful to discharge into navigable waters or adjacent tributaries any refuse other than liquids flowing from streets or sewers. In 1970, the Refuse Act permit program was created to accelerate and strengthen cleanup efforts pending new legislation. This mechanism established an information-gathering system for industrial effluents and resulted in legal action against several industries. The program was aborted in 1972, however, and enforcement efforts were halted by Federal court decisions.

The Federal Water Pollution Control Act of 1972 immediately filled the gap. Passed over Presidential veto, the Act calls for "zero discharge into U.S. waterways by 1985" and establishes national limits on toxic waste discharges. It also sets performance standards for new plants in 28 industries, allows the Federal Environmental Protection Agency to issue abatement orders, establishes effluent limits and fines, promises a minimum of 70 per cent Federal reimbursement for costs of local sewage treatment plant construction, and allows citizens to bring suits against polluters and the Federal E.P.A. under certain conditions.

The Act mandates the States to issue permits, subject to E.P.A. review, as part of the National Pollutant Discharge Elimination System. It is important to note that the Water Pollution Control Act in no way supersedes the authority of the Army Corps of Engineers to enforce the Refuse Act of 1899, insofar as the dumping of refuse interferes with navigability.

Ocean Dumping Act

The 1972 Marine Protection Research and Sanctuaries Act, commonly referred to as the Ocean Dumping Act, protects U.S. waterways from the polluting activities of vessels. The Act regulates dumping through the issuance of permits by E.P.A. or, in the case of dredge spoils, by the Corps of Engineers pursuant to E.P.A. criteria. Acting for E.P.A., the Coast Guard issues most of the permits. It is also responsible for monitoring dumping and clean-up operations and, in extreme cases, for actually performing the work.

The National Environmental Policy Act of 1969 insures that environmental factors are considered in any Federal or Federally funded project. NEPA requires Federal agencies to prepare detailed statements concerning the effects major projects could have on the quality of the environment. The Act imposes only procedural duties - primarily the preparation of an Environmental Impact Statement. There is no provision requiring that a project be amended, altered, or rejected on environmental grounds.

The Federal Flood Disaster Protection Act of 1973 extends flood insurance coverage and restricts new construction in existing flood hazard areas. In an effort to encourage the use of flood insurance, Federal disaster and other significant aid will no longer be available after July 1, 1975 in identifiable hazard areas. The City must meet strict Federal standards to qualify for the new insurance program.

STATE JURISDICTION

The State has title to most underwater land in New York City, which it holds in trust for the public. Under the Public Lands Law, the State may transfer these lands to promote commerce, develop a public park, or facilitate navigation.

Because the Federal government regulates interstate commerce, the State's powers are limited to intrastate waters. The State does, however, have extensive authority over environmental matters and related land-use issues.

The State's major jurisdiction derives from the Environmental Conservation Law of 1972 and the Tidal Wetlands Act of 1973.

Environmental Conservation

The Department of Environmental Conservation, created by the Environmental Conservation Law, is required to formulate and revise a Statewide environmental plan for management and protection of the State's environment and natural resources. It is also responsible for issuing permits concerning stream protection, construction, and wetlands. Article 15 of the Law requires that stream protection permits be issued for all dredging and landfill projects in the City's navigable waterways.

The Environmental Conservation Law retains the Environmental Advisory Council. The Council consists of seven private citizens, appointed by the Governor, who advise the Governor on environmental conditions and trends and recommend environmental legislation. The Law also provides for the appointment of a 16-member Environmental Board. Working within the Department of Environmental Conservation, the Board appraises the effectiveness of environmental programs.

Wetlands Act

The 1973 Tidal Wetlands Act is actually an amendment to the Environmental Conservation Law. It requires the Department of Environmental Conservation to prepare an inventory of all the State's tidal wetlands, prior to completion of a Master Plan for their management.

In this interim period, the Department has placed a moratorium on altering any wetlands without a permit. "Wetlands" have been interpreted to include all land 300 feet landward of the high water mark to three miles seaward, virtually all of New York City's waterfront.

In order to avoid conflicts between these interim measures and provisions of the as-yet-uncompleted Master Plan, moratorium permits expire when wetlands are designated. Projects which lie within protected wetlands then become subject to new land-use regulations. Developers undertaking projects in such areas must demonstrate that the wetlands will be protected and preserved.

The Federal Coastal Zone Management Act granted $171 million to the states for developing Coastal Zone Management programs for the period 1972-77. New York State has received $335,000 for fiscal 1973-74, with future grants expected in the same range.

It is unclear what role the City will play in management of these funds. Under the law, local participation must be encouraged. The New York State Office of Planning Services has prepared a Proposed Coastal Zone Program for discussion and review. However, because only a small portion of the overall funding can be allocated to the New York metropolitan area, the main benefit of the program will probably be that it will coordinate different areas of jurisdiction.

Recreation Commission

The State Park and Recreation Commission for New York City, established in 1967, is concerned with parks in the City, and has emphasized waterfront development. It created and operates Harlem River State Park in the Bronx. The Commission's plans include:

- Riverbank, a 50-acre park to be built over the North River Water Pollution Plant on the Hudson River;
- A major park at Sherman Creek in Washington Heights;
- The South Street Seaport Maritime Museum;
- An ecological park on Staten Island's shore.

In 1972, the State Legislature passed the Environmental Quality Bond Act. This Act empowers the State to sell bonds for preserving and improving the quality of the State's waters. Municipalities may submit applications for State assistance in funding projects meeting the qualifications of the Act.

CITY JURISDICTION

The City of New York has primary day-to-day responsibility for its waterfront, including the treatment and control of pollution discharges, and zoning for and construction of waterfront structures.

The Department of Water Resources, part of the Environmental Protection Administration, is responsible for water pollution control. The Department treats 1.1 million gallons of waste daily in the City's sewage system. It also monitors the activity of local industry, and can charge firms for the treatment of incompatible waste. It can punish persistent industrial polluters by cutting off their water supply.

The Department of Health is responsible for the regulation and control of pollution discharged directly into the City's waterways. It maintains an inventory of active industrial polluters and mandates abatement schedules from violating firms. The Department attempts to abate pollution sources by diverting them into public or private treatment systems. The industry is then subject to Department of Water Resources regulation. The Health Department also reviews construction plans for sewage treatment plants and determines when beaches are safe for swimming.

The Department of Ports and Terminals, part of the Economic Development Administration, issues permits for discharging pollutants and for dumping debris in the harbor or on waterfront property.

The Fire Department monitors the transport of oil within the Port of the City of New York. It also responds to oil-spills, and assists the Coast Cuard in clean-up operations.

Environmental Order

The City Environmental Protection Order of 1973 established an environmental review procedure for municipal projects, similar to the one mandated by NEPA. The City's Environmental Protection Administration reviews proposals for their impact on the physical environment. Like NEPA, the Order imposes procedural duties only.

Although the City has overall responsibility for land-use along its waterfront, the State retains the right to supersede the City's jurisdiction, as it has done with the Tidal Wetlands Act, which inhibits waterfront development throughout the State.

The City Planning Commission regulates waterfront development through its control of zoning and land use. Of special importance is the Commission's power to zone out to the pierhead line, enabling the City to utilize the development potential of underwater lands abutting the shore.

Enforcement of the Zoning Resolution along the waterfront falls largely to the Department of Ports and Terminals. The Department can acquire, through condemnation, any waterfront property for public purposes. Its responsibilities include the enforcement of regulations concerning construction, maintenance, use, occupancy, safety, and sanitary conditions of waterfront structures. The Department also prepares plans for terminal facilities, including those on the waterfront.

The Department of Buildings issues permits for housing construction along the waterfront, as well as elsewhere.

INTERAGENCY COMMISSIONS

The Tri-State Regional Planning Commission reviews all projects receiving Federal aid. It is the official regional planning agency for Connecticut, New Jersey, and New York. These states, as well as the City and the Federal government, sit on the policy-setting Board of the Commission, though the City is under-represented, having only one of 15 votes.

The Federal Water Resources Planning Act established the New England River Basins Commission in 1967. The Commission coordinates Federal, State, interstate, local, and non-governmental development plans for water and related land resources within its jurisdiction, which includes the Connecticut coast and Long Island Sound.

The Port Authority of New York and New Jersey, created in 1921, is a long-established public corporation, empowered to purchase, construct, lease and operate any terminal or transportation facility within the Port district. The district is composed of all land or water within a 25-mile radius of the Statue of Liberty. Under the sponsorship of the Tri-State Regional Planning Commission, the Authority has participated in a Coastal Zone Study since 1971. The study aims at resolving multiple-use conflicts along the shoreline of the harbor and outlying areas.

CONCLUSION

Due to the enormous growth of urban centers with water frontages, cities such as New York have come to assume significant administrative and regulatory roles in waterfront management. Despite intricate jurisdictional overlaps, the City plays a major, if unofficial, role in State and Federal permit processes. Most of these permits are now contingent on City approval.

Legislative focus has shifted from laws concerning navigation to those concerning environmental quality. Many Federal laws originally designed to regulate navigation and further commerce are being reinterpreted by the courts as measures for environmental control. In addition, important pollution control measures have proliferated on every level of government. These developments attest to the increasing awareness of the waterfront as a major natural resource.

Federal and State roles in waterfront planning and management are being re-evaluated. The Coastal Zone Management Act and the creation of Gateway National Park demonstrate that the Federal government has acknowledged the urban waterfront's importance.

The Act, while not exclusively designed for urban centers, represents a significant first step in comprehensive waterfront planning. Effective coastal zone planning must recognize the uniqueness of the urban waterfront.

It is to be hoped that Federal and State funds will soon be allocated specifically for urban waterfront planning and management. The burden of maintaining and improving this precious resource should no longer be borne by the City alone.

- Why are the New York City coastal wetlands so important?

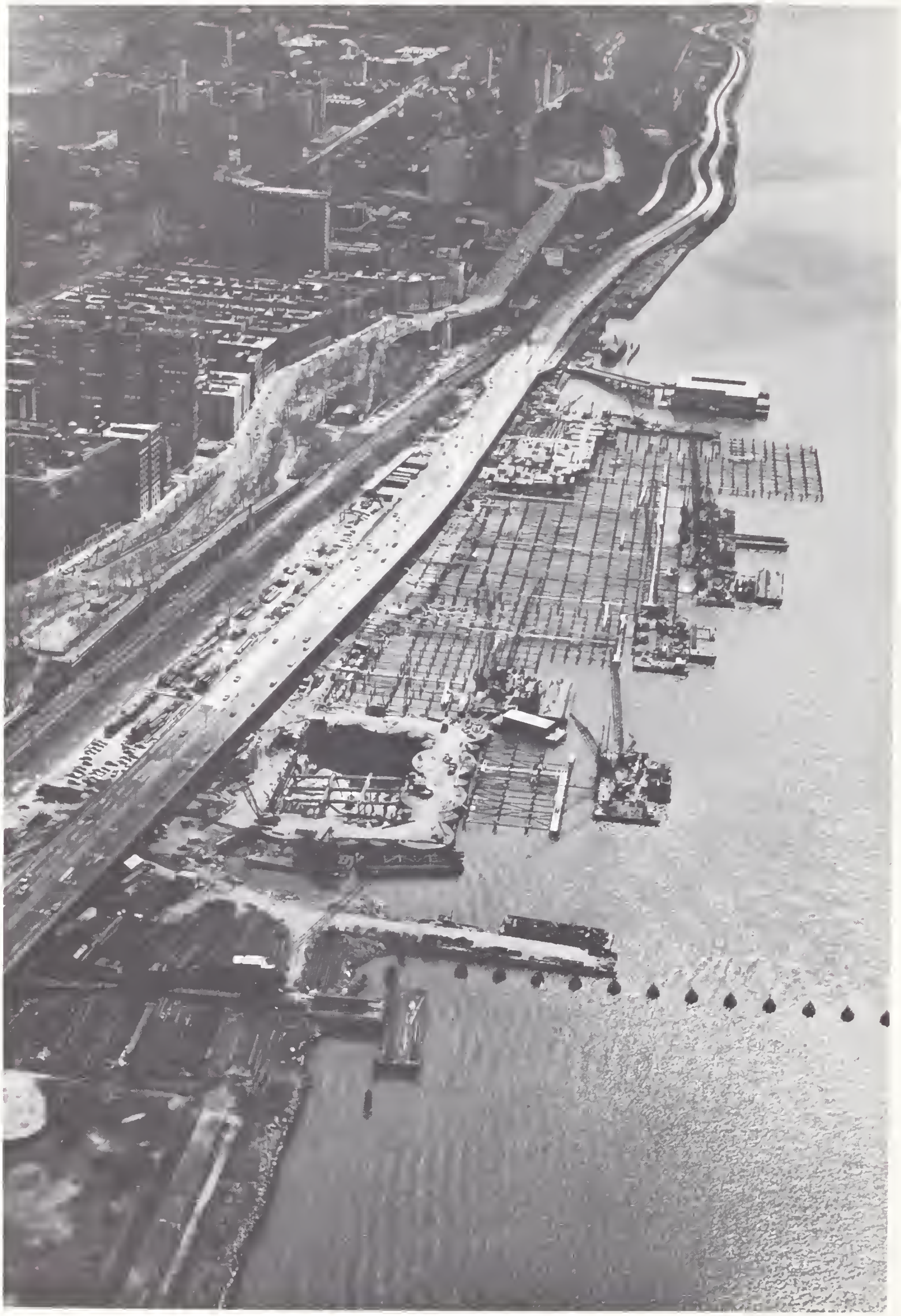
- What impact is the City's Water Pollution Control Program having on water quality?

- What alternatives are there to offshore dumping of sewage sludge?

- How serious a problem is thermal pollution?

- Should all coastal waters be cleaned up at any cost?

- What environmental facility uses require a waterfront location?



ENVIRONMENTAL CONSIDERATIONS:

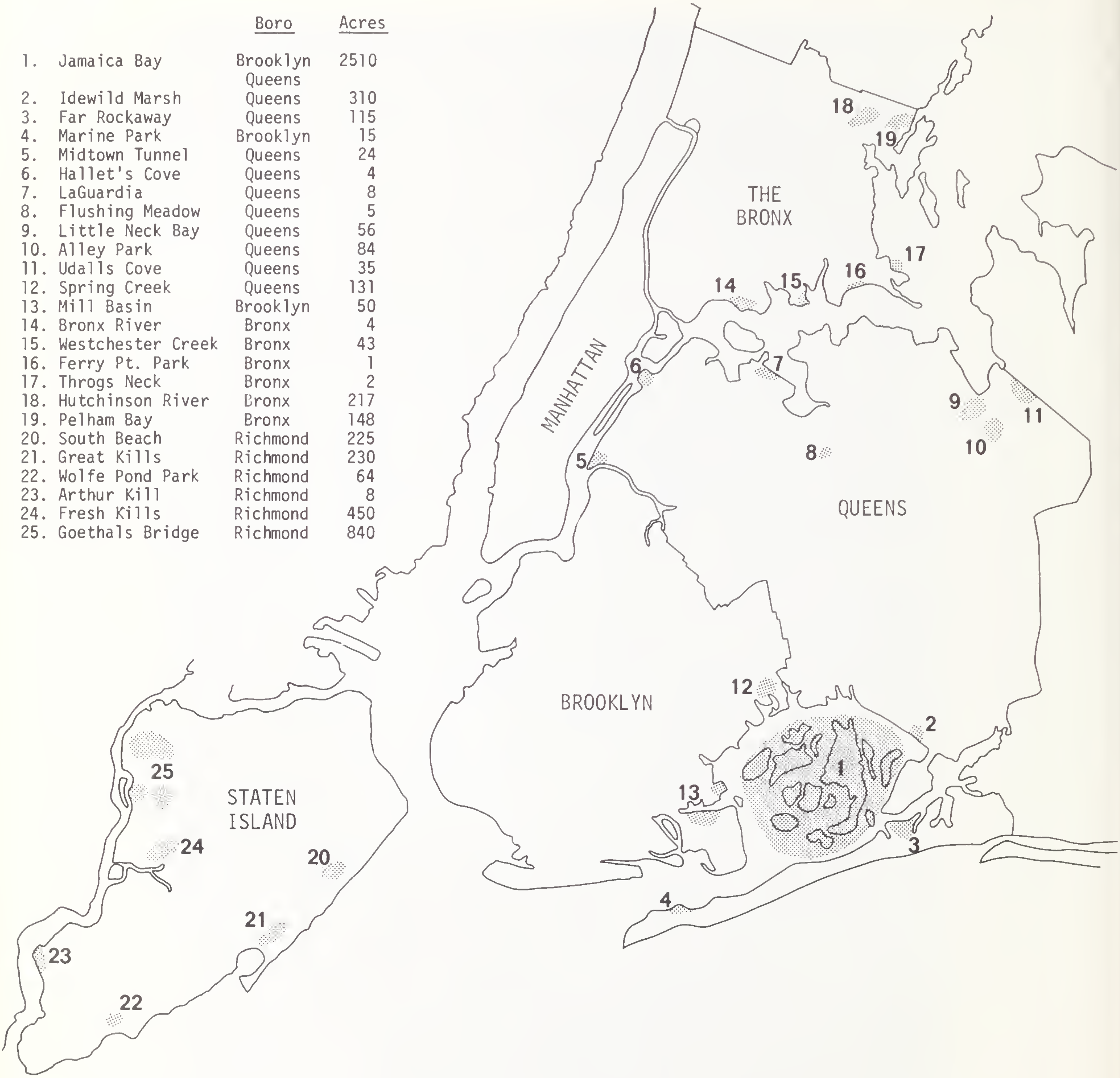
The North River Pollution Control Plant, now under construction off 137th - 145th Streets, will eliminate the last raw sewage discharges from Manhattan.

The environmental aspects of the waterfront are perhaps the single most critical factor for future waterfront planning. The difficult problems of disposal of solid and liquid wastes, dumping and dredging, and thermal pollution (discharge of heated water) from industries and power plants must be balanced against the need for electrical energy, navigation channels for ships, collection and disposal of garbage, and the preservation of the natural environment.

The relationship between a given use and the environment works both ways: the use affects the environment, but the environment also affects the available use choices and waterfront planning. A recreation facility (especially swimming) depends directly on water quality, and waterfront housing as well is somewhat affected by water quality.

The environment of the waterfront is not limited to the quality of the water, but also includes numerous other factors, such as sewage and storm water treatment, vehicular traffic generated, and air quality. The most important factor in waterfront planning, however, is the survival of the natural role of the coastal wetlands.

	Boro	Acres
1. Jamaica Bay	Brooklyn Queens	2510
2. Idewild Marsh	Queens	310
3. Far Rockaway	Queens	115
4. Marine Park	Brooklyn	15
5. Midtown Tunnel	Queens	24
6. Hallet's Cove	Queens	4
7. LaGuardia	Queens	8
8. Flushing Meadow	Queens	5
9. Little Neck Bay	Queens	56
10. Alley Park	Queens	84
11. Udalls Cove	Queens	35
12. Spring Creek	Queens	131
13. Mill Basin	Brooklyn	50
14. Bronx River	Bronx	4
15. Westchester Creek	Bronx	43
16. Ferry Pt. Park	Bronx	1
17. Throgs Neck	Bronx	2
18. Hutchinson River	Bronx	217
19. Pelham Bay	Bronx	148
20. South Beach	Richmond	225
21. Great Kills	Richmond	230
22. Wolfe Pond Park	Richmond	64
23. Arthur Kill	Richmond	8
24. Fresh Kills	Richmond	450
25. Goethals Bridge	Richmond	840



THE NATURAL SYSTEMS

New York City is located at the confluence of a large sound, two straits,[1] and the Atlantic Ocean, making it a truly aquatic-bound metropolis. The harbor of New York City contains several large bodies of water, including the Lower Bay, Upper Bay, Newark Bay, Arthur Kill, Kill Van Kull, Raritan Bay, Jamaica Bay, and the East and Hudson Rivers. This incredible natural resource is an excellent physical setting for both a city and a natural estuary.

Estuaries are defined as semi-enclosed coastal bodies of water with a free connection to the open sea and within which seawater is diluted by fresh water (rivers) from the surrounding drainage basins. This mixing of fresh river water and salt water in a semi-enclosed area results in two primary estuarine features: varying salinity and strong tidal and river current interactions. Because of these features, estuarine water contains high concentrations of dissolved oxygen in the water (called DO) and organic nutrients. The result is one of the world's most biologically productive environments.

The natural functions of coastal wetlands can be summarized as follows:

- Hydrologic Function: The wetlands serve as a natural buffer for storm and tidal currents. With the implementation of the new Federal Flood Insurance Program, this function gains special practical importance.

- Filtering - Anti Pollution Function: As water ebbs and flows through the wetlands, suspended particulates and other potential pollutants are filtered out and deposited in the vegetation. This sediment trap serves to lower water turbidity (thus raising the level of photosynthesis and water quality) and prevents excessive need for the dredging of coastal channels. Further, the highly productive vegetation also serves to lower pollutants' concentration by oxidation of suspended and deposited matter. Thus, healthy wetlands serve to filter and cleanse the water and effluents flowing into the estuary.

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[1] The East and Harlem Rivers are really tidal straits.

Extremely High Bioproductivity and Fish and Wildlife Habitat Function: The high productivity of the estuary yields a habitat that serves as breeding, nesting, feeding, and protective grounds for many species of fish, birds, invertebrates and other wild life. From man's viewpoint the most important animals of the estuary are the larvae of hundreds of marine animals ranging from shrimp to fishes. In fact, the rich supply of nutrients forms the basis of the food chains that support most of the fish and shellfish of the world. For example, 90 per cent of the marine fish harvested by American fisherman comes from the continental shelf. Of these, about two-thirds pass through the estuary between spawning and adulthood or spend their larvae years in estuarine nurseries. The estuary is often called "the breadbasket of the world." For all its productivity, the estuary is a delicate system built on a fairly unstable base. Although estuarine species are adapted to wide environmental fluctuations, if too great a change occurs some species would be eliminated, and the entire interrelated system could collapse. An estuarine system breakdown would affect the unique environmental factors essential for the spawning and rearing of many nonestuarine species and most of the nation's important commercial and marine sport fish.

The estuary functions in subtle and often unsuspected ways. These are derived from the basic ecological functions that are at work within the estuary wetland complex. The ability of the wetlands to act as a tidal surge and flood control area, the pollution filtration function and the exceptional productivity all combined to add to the basic environmental stability of man's self-made ecosystem - the City.

In addition to, and often in spite of, these impressive natural functions, the New York City estuary serves many other purposes. It provides accessibility, an excellent semi-enclosed harbor, and water for industrial cooling purposes. Too often, it has also been a dumping ground for solid and liquid wastes.

It is clear that many of man's more disruptive uses of the estuary wetlands are in direct conflict with the basic biological health of the natural estuarine system. Consequently, some of the very ecological qualities that drew man to the estuary are seriously affected by man-induced disruptive change.

The estuary can also provide the opportunity to study dramatic natural phenomena in an outdoor, living classroom-laboratory. This is a valuable asset in New York City where very large numbers of people have comparatively easy access to still viable wetland areas. Such a program is being set up in Jamaica Bay as part of the Gateway National Recreation Area.

The estuary also provides opportunities for numerous recreation activities, including swimming, fishing and boating, and can also be used for commercial reproduction of shellfish without environmental harm.

Tidal Wetlands

Ecologically, the tidal wetlands form the most valuable single component of the estuarine system. These wetlands are in reality much more than just "wetland", and include the area bounded by the mean low tide water mark and the high spring and storm tide water mark, and the associated "upland" areas.

In New York City, the tidal wetland acreage has decreased markedly in the last several decades. In 1954, the Bronx contained about 2,000 acres of coastal wetlands; only approximately 400 acres remain. More than a third of the Queens wetlands and half of Brooklyn's were lost during the same period of time. Richmond's marshes have not as yet been decimated, but development pressures are mounting.

Currently there are approximately 25 salt marshes in the City comprising a total of 5,582 acres. Of this, 45 per cent or 2,510 acres are in the Jamaica Bay marsh, which has recently been turned over to Federal control and will become part of Gateway National Park. However, this still leaves some 15 marshes of 35 or more acres within City control or a total of about 3,072 acres. While some preliminary analysis has been performed on the relative ecological value of these remaining marshes, substantial additional work needs to be done. Conservation and land use decisions should be based on an accurate knowledge of the ecological value of the marshes, as well as the other components of the estuarine system.

WATER POLLUTION CONTROL PROGRAMS

The pollutant-laden discharges that enter the harbor have a significant effect upon the City's coastal water quality and consequently affect the natural ecosystem and the quality of life in the City. The sources of these pollutants are complex and variable. They include sewage, industrial waste, ocean dumping, and discharges from other surrounding municipalities. Among the more serious pollutants are the 1.8 million gallons of partly treated sewage effluent that daily enter City waters. This is aggravated by a long-standing problem, the City's "combined sewer system" for both sanitary sewage and storm water. This combination makes adequate sewage treatment impossible during any period of precipitation and burdens the receiving waters with massive amounts of pollution.

This situation has led to an intensive and costly cleanup effort, which, the data shows, has prevented further degradation of the City's waters.

The first real water pollution control program was begun in New York City in 1931, and since that time, 13 treatment plants have been completed.

The classification and specific center quality objectives for the City are provided by the Interstate Sanitation Commission (ISC). The classifications are described by possible uses and the quantity of Dissolved Oxygen (DO):

A: Suitable for primary contact recreation.[2] Also suitable in designated areas for shellfish harvesting. Minimum dissolved oxygen of 5 parts per million.

B-1: Suitable for fishing and secondary contact recreation.[3] Minimum D.O. of 4 parts per million.

B-2: Suitable for fish survival, passage of anadramous fish and for any other reasonable purposes compatible with their use for navigation. Minimum D.O. of 3 parts per million.

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[2] "Primary Contact Recreation" means recreational activity that involves significant ingestion risk, including but not limited to wading, swimming, diving, surfing, and water skiing.

[3] "Secondary Contact Recreation" means recreational activity in which the probability of significant contact with the water or water - ingestion is minimal, including but not limited to boating and fishing.

WATER POLLUTION CONTROL PLANTS

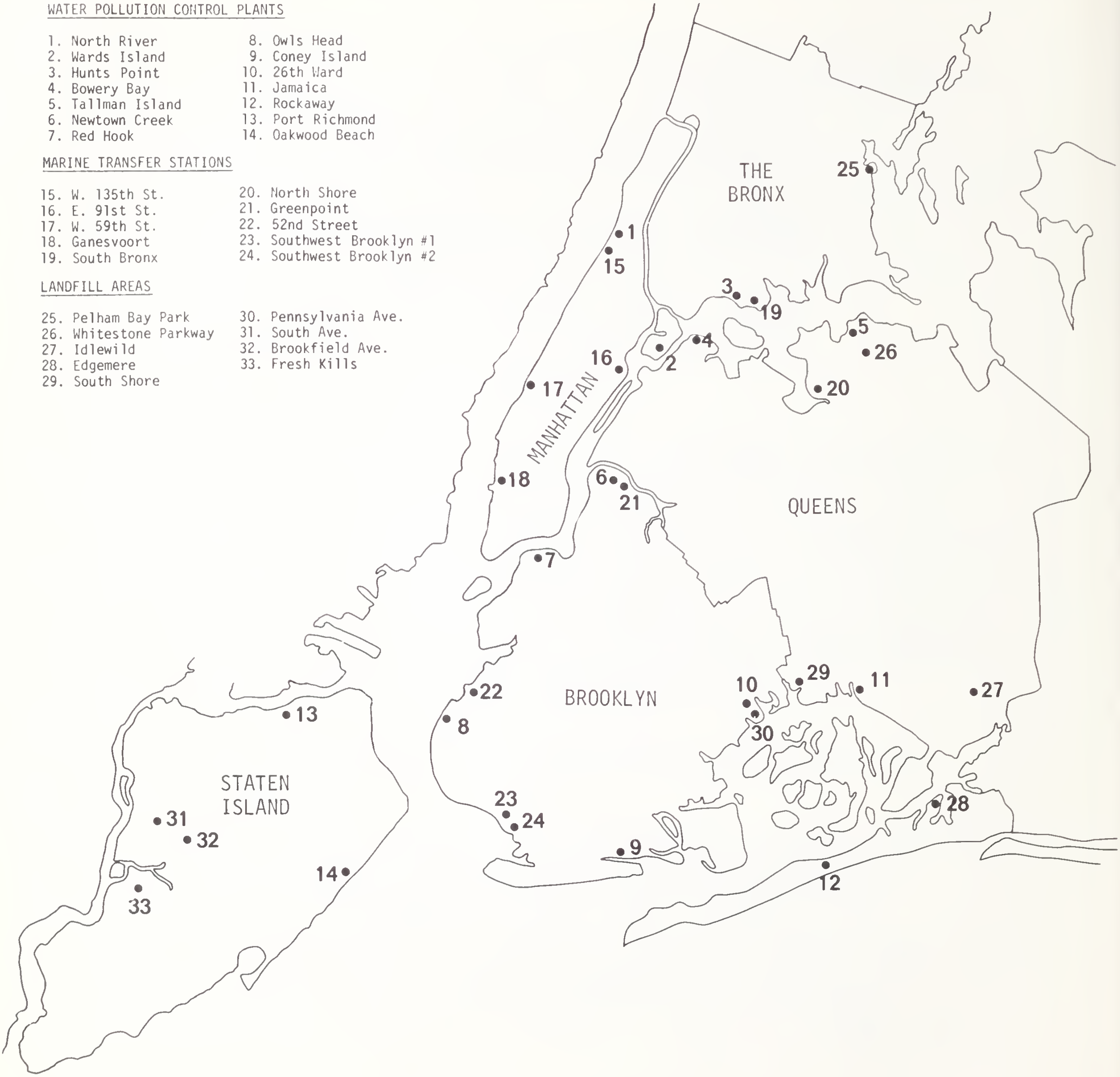
1. North River
2. Wards Island
3. Hunts Point
4. Bowery Bay
5. Tallman Island
6. Newtown Creek
7. Red Hook
8. Owls Head
9. Coney Island
10. 26th Ward
11. Jamaica
12. Rockaway
13. Port Richmond
14. Oakwood Beach

MARINE TRANSFER STATIONS

15. W. 135th St.
16. E. 91st St.
17. W. 59th St.
18. Ganesvoort
19. South Bronx
20. North Shore
21. Greenpoint
22. 52nd Street
23. Southwest Brooklyn #1
24. Southwest Brooklyn #2

LANDFILL AREAS

25. Pelham Bay Park
26. Whitestone Parkway
27. Idlewild
28. Edgemere
29. South Shore
30. Pennsylvania Ave.
31. South Ave.
32. Brookfield Ave.
33. Fresh Kills



STATUS OF WATER POLLUTION CONTROL PLANT

Facility	Original Construction		Present	Planned Extension or Upgrading		
	Date	Capacity (MGD)	Capacity (MGD)[1]	Capacity (MGD)	Status	Estimated Cost
Coney Island	1935	70	110	110	Awaiting State and Federal Aid	$ 82,200,000
Wards Island	1938	180	220	290	Under Construction	141,300,000
Tallmans Island	1938	40	60	80	Under Construction	43,200,000
Hart Island	1942	1.5	1.5		To be Phased Out in 1977	
Jamaica	1943	65	100	100	Under Construction	27,700,000
Bowery Bay	1949	40	120	150	Under Construction	85,500,000
26th Ward	1949	60	60	85	Under Construction	48,700,000
Rockaway	1951	15	30	45	Under Construction	48,800,000
Hunts Point	1952	120	150	200	Under Construction	101,800,000
Owls Head	1952	80	80	160	Awaiting State and Federal Aid	187,900,000
Port Richmond	1953	10	10	60	Under Construction	174,000,000
Oakwood Beach	1956	15	15	40	Under Construction	263,400,000
Newtown Creek	1967	310	310	410	Awaiting State and Federal Aid	N.A.
North River	--	--	--	220	Under Construction	814,900,000
Red Hook	--	--	--	90	Awaiting State and Federal Aid	329,000,000

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[1] Million gallons per day.

A program is currently underway to upgrade and expand all 13 existing water pollution control plants, and to construct two new plants to service areas not presently served. The upgraded and new plants will provide 85 to 90 per cent treatment of all the City's waste water.[4]

The past emphasis has been only on treating sanitary sewage, as opposed to storm water run-off. This approach comes to grief during heavy rains since there is no way to separate the sewage from rain water run-off in combined sewage. Both enter the City's waters when treatment plants are overloaded.

To solve this problem, auxiliary storm water treatment plants are being built to treat these combined sewer overflows. This program will be particularly helpful in insuring water quality at present and proposed New York City beaches.

ANALYSIS OF WATER QUALITY

Upper East River and Eastchester Bay

Background

Using harbor survey data going back to 1909, a vivid picture emerges of the changes that have taken place in New York City's estuarine waters. From 1909 - 17, water quality in the Upper East River underwent a rapid and sustained decline. The DO levels plummeted, but then remained relatively constant from 1917 to the present. Increases in the quantity of sewage discharged have been offset by three secondary sewage treatment plants (Tallman's Island - 1938; Bowery Bay - 1949; and Hunt's Point - 1952).

Water Quality

These waters are considered of recreational quality by the Interstate Sanitation Commission. All the waters east of the Bronx Whitestone Bridge have been classified for primary recreation (Class A), while the waters between Rikers Island and the Bronx Whitestone Bridge have been classified B-1. At the present time, all sewage discharged to these waters is receiving secondary treatment. Of the three sewage plants, fully effective chlorination is practiced only at Tallman's Island. Because of this, the bacterial counts in the Upper East River exceed the bathing water standards of the Department of Health. Due to circulation and dilution by Long Island waters, Eastchester Bay meets the standards and Orchard Beach is approved for swimming.

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[4] These numbers actually refer to removal of "Biochemical Oxygen Demand," a common measure of water pollution.

All three existing plants are hydraulically overloaded and are providing removal efficiencies below that for which they are designed. All three are in the process of being expanded. Besides providing additional capacity for water consumption, these expansions will provide 90 per cent removal for the waste water flows.

East River and Harlem River

Background

Except for the Arthur Kill, the East and Harlem Rivers have the harbor's poorest quality of water. Both these bodies are tidal straits, with little or no fresh water inputs; since tidal flushing is minimal, both bodies act as traps for pollutants.

As in the Upper East River, DO levels plummeted in 1907 - 1917 from 60 - 70 per cent saturation to 20 - 30 per cent saturation. Until the Ward's Island Pollution Control Plant was built in 1938, the full length of the Harlem River was continuously receiving raw sewage discharges from Manhattan and the Bronx. The Ward's Island Plant improved saturation by 30 per cent in the Harlem River. The East River improved less than that because the plant only eliminated the raw sewage discharges north of 72nd Street. South of 72nd Street, the River is in the Newtown Creek Drainage Area and as such should have been receiving secondary treatment since 1967. However, unusual soil and foundation conditions have held up completion until 1975 of the pumping station needed to pump this sewage to the Newtown Creek plant.

Water Quality

These waters have the lowest of the three possible classifications, B-2, primarily for navigation.

Since no beaches are intended for this region, no auxiliary plants are planned. The expansion of the Ward's Island plant will enable the plant to meet the 90 per cent removal requirements and will reduce bacteria counts.

Hudson River and Upper Bay

Background

The quality of water in this region is affected jointly by New York and New Jersey. Although raw sewage is being discharged from the West Side of Manhattan and sections of Brooklyn and Staten Island, the contribution from New Jersey is at least three times as great, and little progress is being made in stopping it. The new North River Plant now under construction will eliminate the last raw sewage discharges from Manhattan. This plant is extremely expensive, and its benefit will be marginal if other municipalities do not undertake similar projects. The new Red Hook Plant, fully designed and awaiting State and Federal funding, will eliminate the last of the raw sewage discharges from Brooklyn. The expansion of the Port Richmond plant, which is heavily overloaded, and the new East Branch interceptor, both now under construction, will intercept and treat raw sewage discharges from the St. George area of Staten Island. The Owl's Head plant is overloaded, and the new design calls for doubling the capacity, as well as upgrading to provide 90 per cent removal. Construction awaits Federal and State funding. The Newtown Creek plant, because of a high percentage of industrial wastes and almost no adjacent land to expand, is now undergoing feasibility studies to determine ways to provide additional treatment within the confines of the available space. Advanced devices are being evaluated to increase the efficiency of the treatment process.

Water Quality

These waters have been classified B-1 for secondary recreation. The present water quality is just below that required by Interstate Sanitation Commission (ISC). The three upgraded and expanded plants and the two new plants will all provide 90 per cent removal. Since swimming is not an objective, no auxiliary plants are planned.

Lower Bay and Jamaica Bay

Background

Although the Lower Bay has relatively few direct sources of pollutants, its quality is largely controlled by the flow of pollutants from the Upper Bay. Aside from some raw sewage from Staten Island, the effluent from the Oakwood Beach Pollution Control Plan is the only major input. Although the plant is severely overloaded, it provides efficient year-round chlorination. This plant is presently being upgarded.

Jamaica Bay is the largest single wetland in New York City - 13,000 acres, 4,000 of which remain to a great extent in their natural state. In spite of the fact that Jamaica Bay's mean depth is only 16 feet and approximately one-third of the Bay's water flows out through Rockaway Inlet with each ebb tide, little net exchange of Bay water and new ocean water takes place. As a consequence, Jamaica Bay tends to act as a reservoir for pollutants.

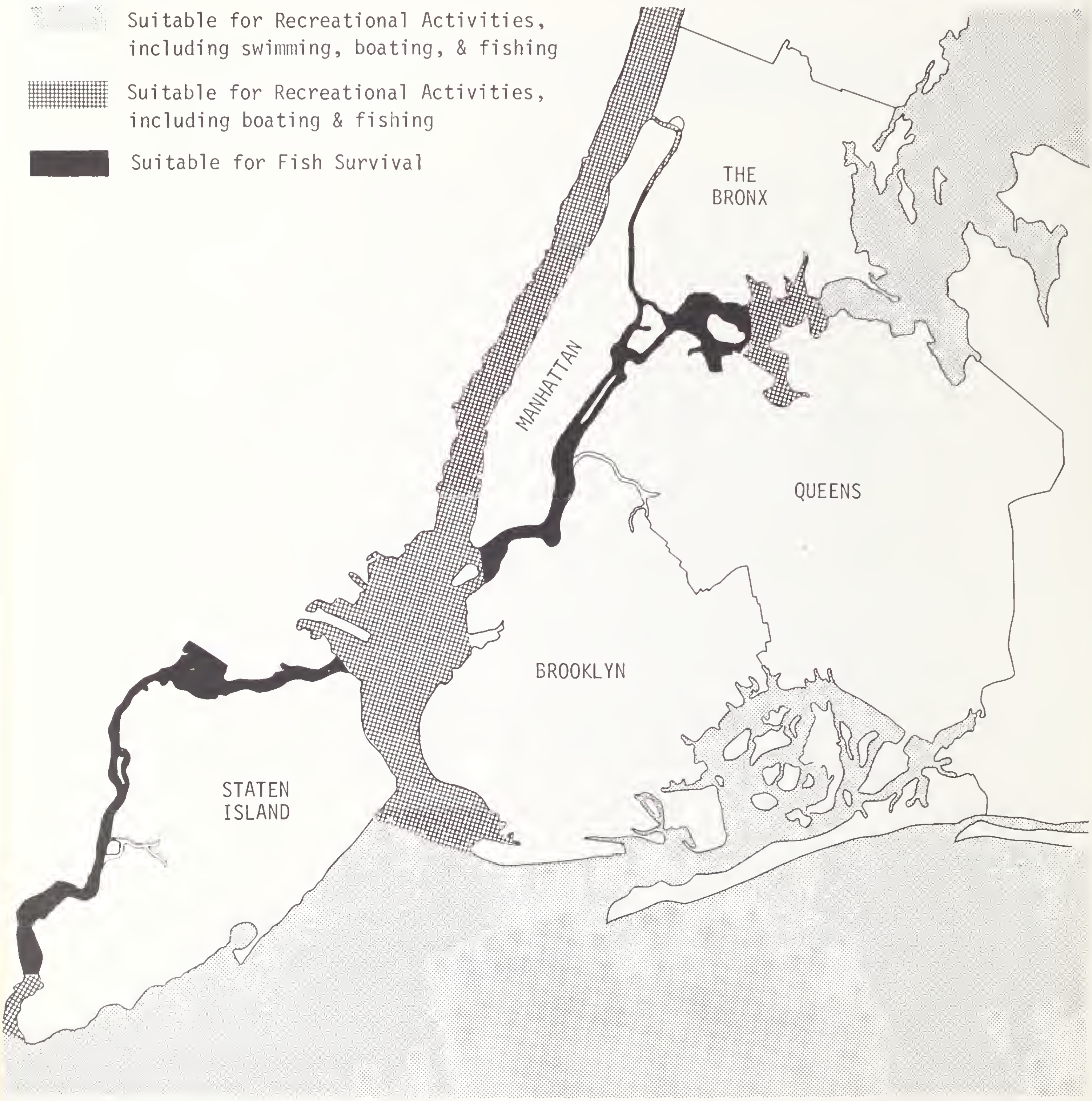
The 26th Ward Water Pollution Control Plant is the only overloaded plant discharging into the Bay. It is also the prime contributor of bacteria. The upgrading of this plant is now underway.

All the three Water Pollution Control Plants impacting on Jamaica Bay - Jamaica, Rockaway, and Coney Island - are scheduled for upgrading to 90 per cent removal.

Because of the beaches proposed for Jamaica Bay, six auxiliary plants are planned, the first of which was completed in May, 1972, at Spring Creek. This is a prototype plant that can serve as a model for the remaining auxiliary plants. At issue is the eventual cost versus the benefit of having swimming in Jamaica Bay.

Water Quality

Jamaica Bay is presently under severe stress. No single source of pollution threatens to destroy the Bay's ecosystem, but in combination and ignored, they would eventually render the Bay unfit for all but the most basic uses.


Suitable for Recreational Activities, including swimming, boating, & fishing
Suitable for Recreational Activities, including boating & fishing
Suitable for Fish Survival
THE BRONX
MANHATTAN
QUEENS
BROOKLYN
STATEN ISLAND

Like other pollution control plants, the Owl's Head plant in Brooklyn will be brought up to 90 per cent removal efficiency under an expansion and upgrading program. Efficiency is now 60 per cent.

Marine transfer stations, such as this South Bronx station in Hunts Point, handle more than one-fourth of the City's solid wastes. Trucked to the station, the solid wastes are then transported by barge to landfill sites.

SLUDGE DISPOSAL

The final product of sewage treatment, after the treated water is returned to the waterways, is a thick inert sludge. The quantity and character of the sludge varies according to the sewage treatment process, with an average of 70 tons of sludge for each 100 million gallons of sewage treated. A fleet of four vessels operated 24 hours a day by the Department of Water Resources picks up the sludge and takes it to a dumping site 12 miles offshore, designated by the Corps of Engineers. (See Environmental Facilities map.)

This procedure costs about $15 per ton and is the cheapest method of sludge disposal. There is a major problem, however, in that a so-called "dead sea" has been created surrounding the dumping site. Sooner or later this will directly impact the coastline, and so a proposal has been developed to move the sludge-dumping area 48 to 78 miles off the Rockaways. This will greatly increase the cost of dumping, however. It is calculated that moving the dumping site to 100 miles offshore would increase the annual cost of disposal from the present $1.4 million to $6.0 million.

There are other techniques for disposing of sludge, including land disposal (spreading it over porous agricultural land) and incineration. While these are currently more costly than offshore dumping, their feasibility is being investigated. It should be emphasized that at this point no satisfactory solution to the problem of sludge disposal has been found.

OFFSHORE DUMPING AND COASTAL ENVIRONMENTAL IMPACT

In addition to the localized sludge disposal area, there are other specific waste disposal sites in the New York City Region. These sites accommodate the four categories of artificially placed sediments.

The so-called mud site 15 miles from shore in the Atlantic Ocean is the dumping ground for dredge spoils. These spoils amounted to 76 per cent of all wastes dumped in the New York Bight in the 1960's. These wastes, typically containing ash, small stones and debris from storm runoff, are the sediments deposited in channels, slips and docks by littoral currents or transported along with solid wastes from upstream communities by river waters or discharged directly from storm sewer falls. Coal ash has been dumped at this mud site in the past, but because of the reduction in coal use and increased usefulness of ash, little additional ash is expected to be dumped at this site in the future.

A second major deposit is construction waste or rubble. This waste is also used in landfill operations and the amount deposited in the ocean will vary depending on the demand for this use. A third site is provided for special chemical or acid waste disposal at which the various types of industrial wastes are discharged at sea. The fourth major disposal site is the sewage sludge disposal site discussed previously. A fifth site is for the disposal of wrecks.

The immediate impact of waste disposal at sea is the potential smothering of benthic species, injuring eggs and plankton and larvae in the surrounding areas and releasing nutrients which possibly overenrich the receiving waters. Pathogens must be prevented from reaching beaches. What is unknown at this point are the inherent limits of the coastal area for receiving such materials without causing a spiral of excessive damage.

SOLID WASTES

Solid wastes (primarily garbage) generally have little impact on water quality, with the exception of the Marine Transfer Stations which are used to transfer garbage from trucks to barges for the trip to landfill areas, especially the Fresh Kills site in Staten Island. Barging is presently the least expensive and most efficient means of transporting solid wastes, accounting for one-fourth of all such wastes transported. The Environmental Facilities map shows the locations of the Marine Transfer Stations (MTS) operated by the Department of Sanitation. These have been very difficult to site because of environmental quality degradation in the vicinity of an MTS caused by odors and traffic congestion. Also, on occasion, some of the wastes spill into the waters surrounding the MTS. More stringent safeguards in the unloading procedure could eliminate the possibility of garbage spills, and enclosing the process in a building could prevent dispersal of odors into the community. Traffic generation will continue to be a problem, although better control over truck arrival times could reduce this impact.

There is a good probability that existing and/or new electric generating facilities can meet up to 15 - 20 per cent of their fuel needs in the form of solid wastes (which have been shredded and separated). The Department of City Planning is currently studying the feasibility of utilizing the City's rail network to transport these valuable "wastes." Early indications are highly favorable and merit increased consideration. The constraint is that adequate safeguards have to be provided so that these wastes do not, in turn, create a serious air pollution problem. However, all current evidence strongly suggests that, on a comparative basis, solid waste fuel-charged generating facilities will emit less air pollution than conventional generating facilities.

DREDGING

Dredging is the process of removing material from an ocean floor or river bed by mechanical or hydraulic means. In the New York harbor area, dredging is done for two purposes: to use the dredged material (sand and/or gravel) for beach nourishment, landfill, or construction materials; or to create or maintain navigation channels.

Large sand and gravel deposits for both commercial and beach nourishment purposes are located offshore from Coney Island and Rockaway Beach.

Dredging of the major navigation channels takes place constantly. During the last 11 months, approximately 7 million cubic yards of sand have been dredged from the east bank of Ambrose Channel, Chapel Hill North Channel, and Great Kills. Major portions of the dredged material were used in construction of the New Jersey Turnpike and Battery Park City. Dredging can have negative side - effects, causing disruptions in the marine ecological environment. If dredging takes place too close to shore, for example, actual recession of the shoreline may occur. Careful review is therefore required when granting permission to dredge sand and gravel in the New York Harbor.

SPILLAGE

Approximately 76 per cent of the New York metropolitan area's fuel is provided from petroleum products, most of which is imported. A major problem of oil storage and transporting is spillage. In 1973, more than 300 oil spills were reported in the New York Harbor and its tributaries. In the short period from April to June 1973 alone, spills in the area from Sandy Hook, New Jersey to Rockland County (including the harbor and the Hudson and East Rivers) amounted to nearly 487,000 gallons of oil. Oil spillage cleanup is the responsibility of the U.S. Coast Guard, which makes regular patrols by air. An average of three pollution reports are received daily, with an average of one provable case of spillage each day. Approximately 20 per cent of spilled petroleum products and oil is cleaned up. The

Coast Guard assesses fines for provable pollution, with the average amount now $1,000 per case.

ELECTRICAL POWER GENERATION

Electrical generating stations are located at waterfront locations primarily because they are dependent upon the accessibility of bulk fuel deliveries by water and upon the availability of ample water for cooling purposes. Placing these facilities close in is economical but there is a high social cost.

Except for the Rockaways - serviced by the Long Island Lighting Company - all of New York City's electrical energy comes from the Consolidated Edison Company of New York, which operates a total of 11 steam turbine electric generating plants and nine gas turbine plants, all located on the waterfront. In addition, Con Ed operates two nuclear-powered plants at Buchanan, New York on the Hudson River. (New York State may take over several Con Ed facilities.).

Thermal pollution (discharging of heated water which was used for cooling purposes) is associated with each of these facilities. Industrial plant cooling and institutional cooling (at the World Trade Center, Columbia Presbyterian Hospital, and other facilities) also produce thermal pollution which harms aquatic organisms sensitive to changes in water temperature. The temperature of the receiving body of water is often raised as much as 15° - 20° Fahrenheit.

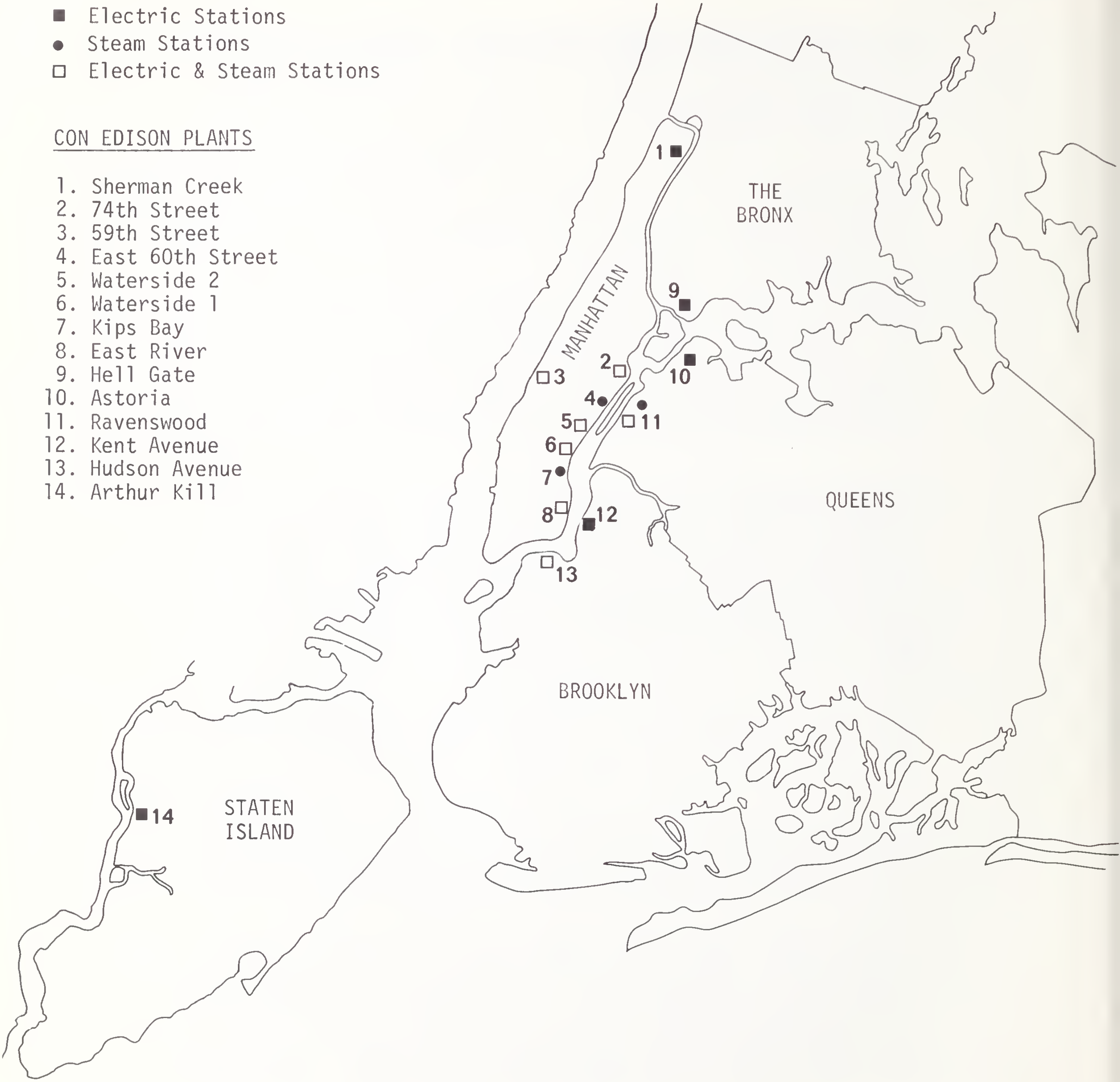
Abnormally high winter temperatures facilitate rapid growth at a time when the environment is not furnishing adequate nutrients. Higher temperature also reduces the amount of oxygen dissolved in the water. Excessive temperatures, both high and low, affect the metabolic rate and may cause the death of aquatic organisms. Rapid temperature changes are the most fatal. Massive fish kills can result when a plant shuts down in the winter, interrupting the discharge of warm water. The New York State Public Health Law has set standards for thermal discharge into estuaries and coastal waters.

Nuclear plants require huge quantities of cooling water, and a recent ruling by the Atomic Energy Commission will eventually terminate the discharge of the Indian Point nuclear generating plant into the Hudson River to protect fish life. In addition, the Federal Environmental Protection Agency has recently proposed that all electric generating plant thermal discharges be prohibited. To accomplish

■ Electric Stations
● Steam Stations
□ Electric & Steam Stations

CON EDISON PLANTS

1. Sherman Creek
2. 74th Street
3. 59th Street
4. East 60th Street
5. Waterside 2
6. Waterside 1
7. Kips Bay
8. East River
9. Hell Gate
10. Astoria
11. Ravenswood
12. Kent Avenue
13. Hudson Avenue
14. Arthur Kill



this, the water must be cooled; this can be tremendously expensive. Moreover, since cooling towers evaporate huge quantities of water, this would reduce the quantity of fresh water available in the Upper Hudson for other uses, and increase the overall salinity of the river.

There is a real issue as to how much should be spent to eliminate present heated water discharges, especially in bodies of water where there is little risk of direct environmental damage and where increased fresh water evaporation reduces the water available for community intensive use.

EROSION

Erosion is the net loss of material from a shoreline over a period of time. It occurs when the rate of material supplied naturally to the shore is less than the natural removal rate.

Over 20 miles of the City's beaches are classified as critically eroding beaches. This erosion has several major causes: the loss of natural defenses against wave attack, infrequent but powerful storm surges, and a reduction in the rate of sand supplied naturally to the shore by nearshore currents (known as the littoral drift).

The natural forces of wind, tides, currents and waves have sculptured beaches over the years and provided them with natural defenses against the countervailing eroding actions of waves and storms. In many locations, offshore bars have formed which cause incoming waves to break, dissipating much of their destructive energy before it is unleashed on the shore. Wind-carried sand has formed on the backshore which acts as a natural levee against storms and provides a supply of sand to feed storm waves. Waves and changes in sea level have cast up barrier islands, protecting the mainland from the ocean and absorbing the direct onslaught of the waves. The gradual sloping of the nearshore bottom dissipates the energy of incoming deep-water waves; the crest or ridge formed by wave action on the seaward side of the beach's berm lessens the impact on the beach of the up-rush of following waves.

Undoing Natural Defenses

These natural defenses are often mutilated or destroyed by man. Sand dunes have been replaced by broadwalks and hotels, or removed simply to provide an unobstructed view of the ocean. Offshore sand bars have been dredged for navigational or landfill purposes. Barrier beaches have been transformed into residential or recreational islands.

To initiate and implement an erosion control project is a tortuous procedure. Local interests must petition their representatives in Congress either directly or through local governments. The Senator or Congressman then requests the appropriate Congressional Committee to direct the Corps of Engineers to investigate. During the investigation, which includes comprehensive surveys and feasibility studies, public hearings are held.

The Corps' findings and recommendations are transmitted to the Secretary of the Army, who eventually turns them over to Congress. The decisive decision lies with the Congressional or Senatorial Committee on Public Works. Following Congressional approval, Congress must appropriate the necessary funds.

Two erosion control projects have been authorized for the City: 1) from Fort Wadsworth to Arthur Kill on Staten Island, and 2) from East Rockaway Inlet to Rockaway Inlet (scheduled to begin in summer 1974). The Coney Island area is now being studied by the Corps.

TIDAL FLOODING

Typically, tidal flooding along the coast occurs in embayments and their adjacent low-lying inland areas. In New York City, these are tidal marshes that are left undeveloped or that, although filled and developed, remain below flood level grade.

Proper development sets up the legal grade above expected flood level based upon a thoroughgoing drainage study. The factors involved include water use, intensity of rainfall, intensity of land development, and pipe sizes, slopes and elevations. Buildings should be sited to facilitate drainage into the sewers.

Some developers request "grade waivers" to allow building below the legal grade. While waivers clear the City of responsibility for flood damage, the eventual unsuspecting owner of the property is obtaining something less than adequate protection.

Flood Insurance

Designated flood hazard areas can become eligible for low - cost Federal Flood Insurance under the Flood Disaster Protection Act of 1973. To become eligible for Federal Flood Insurance, New York City must adopt land use and building code regulations for areas that will be designated by the Federal Insurance Administrator as special flood hazard areas based on a potential 100 - year flood level.

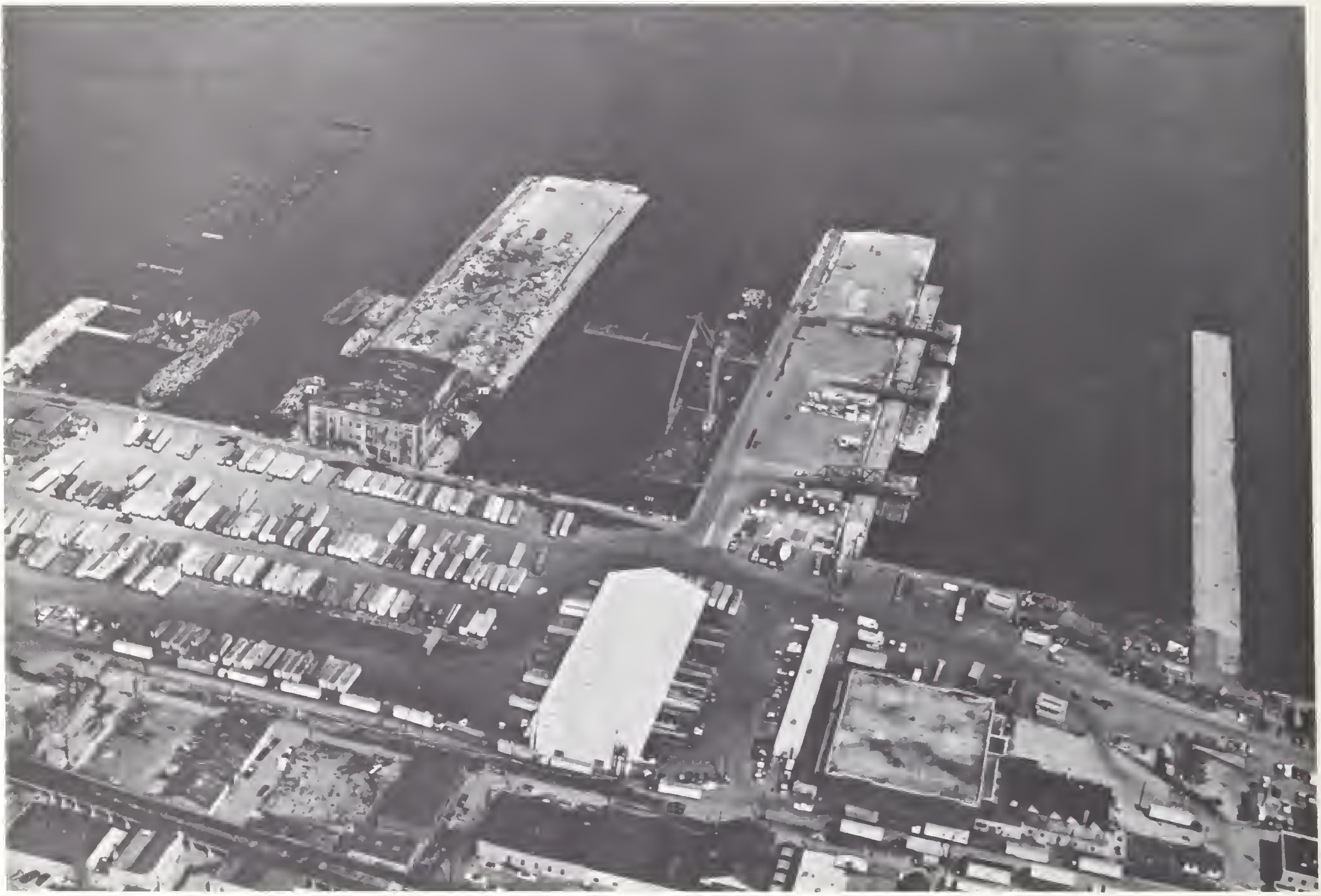
In joining the program the City will incur additional costs to supply flood-proofed infrastructure. The type and amount of construction in the flood hazard areas will require a re-evaluation of planned street, sewer and utility programs. There will also be additional construction costs associated with building procedures in the construction of City projects. Problems will also arise if there is a difference in the mandated building elevations established by the 100-year flood level and official street grades.

economic uses

- What are the major economic uses on the waterfront?

- How do these uses relate functionally to the waterfront?

- Where should economic development be encouraged on the waterfront and where discouraged?



ECONOMIC USES:

The containerport in Stapleton, Staten Island has the most modern equipment, including a "roll-on-roll-off" facility.

Of the City's 578 miles of waterfront, 460 miles lie in the Port of New York. The Port District, including the New Jersey sections, covers 1,500 square miles and embraces 350 municipalities and 13 million people. Port operation involves the cooperation of many Federal, State and municipal agencies.

Only about 30 per cent - a surprisingly small amount - of the City's total shoreline is devoted to industry, transportation and commerce. The City plays a significant role in these economic uses. The City owns 90 per cent of all Manhattan piers. In Brooklyn, where the Port Authority has extensive operations, the City controls about 20 per cent of the piers.

The variety of economic activities on the shore can be classified in terms of their functional relationship to the water rather than in the traditional land use categories of heavy or light manufacturing. This analysis reveals a hierarchy of need for waterfront access by different industries:

- Economic activities, such as shipping, which use water for the transport of goods;
- Activities, such as shipyards, requiring direct access to the water but not for the transport of goods;
- Industries using water;
- Activities, such as airports, attracted to the waterfront;
- Activities located on the waterfront for historical/ miscellaneous reasons.

But the hierarchy of locational need is only one critical element; there are compelling reasons for leaving some installations on the waterfront even though they may not have any functional relationship to the shore.

ECONOMIC ACTIVITIES WHICH USE WATER FOR THE TRANSPORT OF GOODS

Shipping

As a center for through-shipment of goods (e.g., Europe to the Midwest), the Port of New York offers modern containership facilities[1], renovated piers and good highway and rail connections. Both the physical facilities and intermodal transfer points, as well as the frequency of service offered by the numerous shipping lines serving the Port district, give the Port an advantage over competitors which geography alone would not guarantee.

Regional and local industries and consumers benefit from the same facilities, but they also rely heavily on an extensive network of waterways such as Gowanus, Coney Island and Newtown Creeks. Barges, able to move in water depths far shallower than those required for ocean-going vessels, carry vast quantities of bulk products.

In reporting annual tonnages in the Port, the U.S. Army Corps of Engineers divides the figures into four different categories:

a. Foreign trade is the glamour area of waterborne traffic. Giant container facilities are built primarily to serve this traffic, as are bulk product storage facilities (such as petroleum storage tanks);

b. Coastwise trade (domestic only) uses similar facilities; in some cases, it uses barges as well;

c. Internal and local;

d. Local harbor traffic (within the confines of the Port) relies primarily on barges, carrying such bulk products as sand, gravel, oil, and garbage.

More than 1 million tons of rail freight are barged in the New York Harbor annually. Barging freight has traditionally been attractive because of the low cost of shipping large quantities of low value per ton goods; slow-speed barges have not been able to compete with other modes for higher-value processed merchandise, where rapid deliveries are important. While the possibility of developing high-speed barges has been explored, an economic model has not yet been achieved.

Cargo is divided into two types: general cargo, which has a relatively high value per ton, and bulk cargo, which has a relatively low value per ton. While general cargo is usually distributed or transshipped from the Port by truck or rail, bulk cargo usually proceeds by barge to local consumption points. Although bulk cargo looms much larger in terms of sheer quantity, the value of general cargo is far higher.

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[1] Containership facilities allow direct loading and unloading of ships with cargo-filled containers. The loading of individual shipments item by item is called breakbulk shipping.

COMPOSITION OF TRAFFIC, PORT OF NEW YORK AND NEW JERSEY, 1970

	Volume		Estimated Value	
	Mill. of Long Tons	Per Cent	$ Billions	Per Cent
General Cargo				
Containerized	8.1	7%	$ 7.5	36%
Breakbulk	12.6	11%	11.7	57%
Bulk	95.9	82%	1.5	7%
TOTAL	116.6	100%	$20.7	100%

Source: Tri-State Regional Planning Commission

Trends in Shipping Activity

Historically, the New York Port has dominated maritime trade in the United States by a combination of natural geography and the finely-honed competitive spirit of New York merchants: e.g., the first regularly scheduled packet service to Europe began in New York.

Recent figures show that the Port still overshadows other East Coast ports: in 1971, New York handled 181,024,686 tons of cargo, compared to 51,133,893 tons at Philadelphia, its closest East Coast competitor. The Atlantic Coast has more container berths - 37 berths - than any other coast; 22 of these are in the New York Port District.

However, while the Port's tonnage has increased decade by decade, its competitive position has declined. In 1950, the Port handled 29 million tons of foreign cargo, 20.8 per cent of United States trade. But in 1969, with a volume of nearly 54 million tons, the Port's nationwide share dropped to 12.9 per cent. The growth in foreign tonnage handled at the Port of New York has been adversely affected by changes in population growth patterns, the development of other U.S. ports, the shift to alternative modes of transport, the region's changing economic base (the Port's maritime imports-to-exports ratio is now 9 to 1), a change in rail freight rates which favors Gulf and southern ports, and competition from the St. Lawrence Seaway.

Foreign trade increased from 42 million tons in 1961 to 62 million tons in 1972, while coastwise tonnage declined slightly over the same period. Internal traffic grew most - from 8 million tons in 1961 to 23 million in 1972 - while local traffic grew from 38 million tons to 55 million tons.

Within the category of foreign trade, bulk cargo imports (principally petroleum) experienced the greatest growth - from 27 million tons in 1962 to 45 million tons in 1972. Bulk cargo exports (of which grain is the major commodity) were comparatively small - 631,000 tons in 1962, 830,000 tons in 1972. By contrast, general cargo exports declined during the same period from 5.8 million tons to 4.8 million tons. General cargo imports grew from 7 to 10 million tons.

New Jersey's Share of the Port

While maritime tonnage figures do not show the shift which has been occurring internally within the Port from the New York to the New Jersey side of the harbor, waterfront hirings do reveal the marked change which has occurred as a result of the change from breakbulk to container port shipping. Total hirings on the New York City side of the Port declined by 46 per cent from 3,468,063 in 1962-63 to 1,582,161 in 1972-73, a total loss of 1,885,902. In the same period, hirings in New Jersey increased from 953,395 to 1,116,033, a gain of 17 per cent.

During the last decade, Manhattan experienced the greatest decline - 81 per cent, from 1,348,670 to 252,902 hirings. Brooklyn had a decline of 42 per cent, from 2,016,167 to 1,171,547. Both Staten Island and New Jersey grew although the growth was not steady (1969-70 was the peak year): Staten Island hirings were up 53 per cent, from 103,226 to 157,712, while New Jersey grew 17 per cent from 953,395 to 1,116,033.

The geographic shift can be attributed to a great extent to the Port Authority's policy of investing early in containership facilities in Port Elizabeth and Port Newark. Containerization has taken an increasing proportion of the total general cargo handled in the Port, representing only 18 per cent in 1968.[2] By 1970, containerized cargo made up roughly 40 per cent of the

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[2] Source: Tri-State Regional Planning Commission.

Port's general cargo; the proportion is expected to increase to more than 50 per cent by 1975. In 1968, container berths handled a total of 3.7 million long tons.[3] Their share increased to 8.1 million in 1970. By 1975, the volume is expected to be 12.4 million long tons.

Clearly, the New Jersey side has benefited from its advanced technology. Although the New York City side is attempting to catch up, the New Jersey side will probably continue its domination: if all currently planned container berths are built, New Jersey will have 26 berths, compared to 18 in New York.[3]

While existing container facilities handled an average of 500,000 tons per berth, the actual capacity of an efficiently operated facility is 1.5 million tons per berth. This excess capacity of 1 million tons per berth allows for expansion in cargo handling. When all the container berths in planning are built,[4] the New York Port could have a margin of more than 45 million tons over the projected 1990 cargo volume of 18-21 million long tons.

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[3] Source: Tri-State Regional Planning Commission.

[4] These include City facilities, including plans for the Brooklyn Waterfront. (See table following page.)

CONTAINERSHIP FACILITIES, PORT OF NEW YORK
February, 1973

	Existing		Additional Planned		Total	
	Number Berths	Acres	Number Berths	Acres	Number Berths	Acres
Port Authority of N.Y. & N.J. Terminals						
Port Elizabeth, Elizabeth	18	700	0	0	18	700
Port Newark, Newark	4	200	0	0	4	200
New York City Terminals						
Northeast Marine Terminal, Brooklyn	2	50[b]	2	65	4	115[b]
Howland Hook, Staten Island	3	80	0	95	3	175
Marine Terminal of the Narrows, Stapleton, Staten Island	2	30	(2 repl.)	20	2	50
Red Hook, South Brooklyn[c]	0	0	2	75	2	75
Hunts Point, Bronx	0	0	2	40	2	40
Bush Terminal, Brooklyn (to be a part of Northeast Marine Terminal)	0	0	3	150[b]	3	150[b]
Brooklyn Army Terminal, Brooklyn	0	0	2	90	2	90
Private Terminals						
Port Jersey, Jersey City	2	85	(a)	325[b]	2+[a]	410[b]
Port Seatrain, Weehawken	2	30	(a)	20[b]	2+[a]	50[b]
TOTAL	33	1,175	11	880	44+[a]	2,055

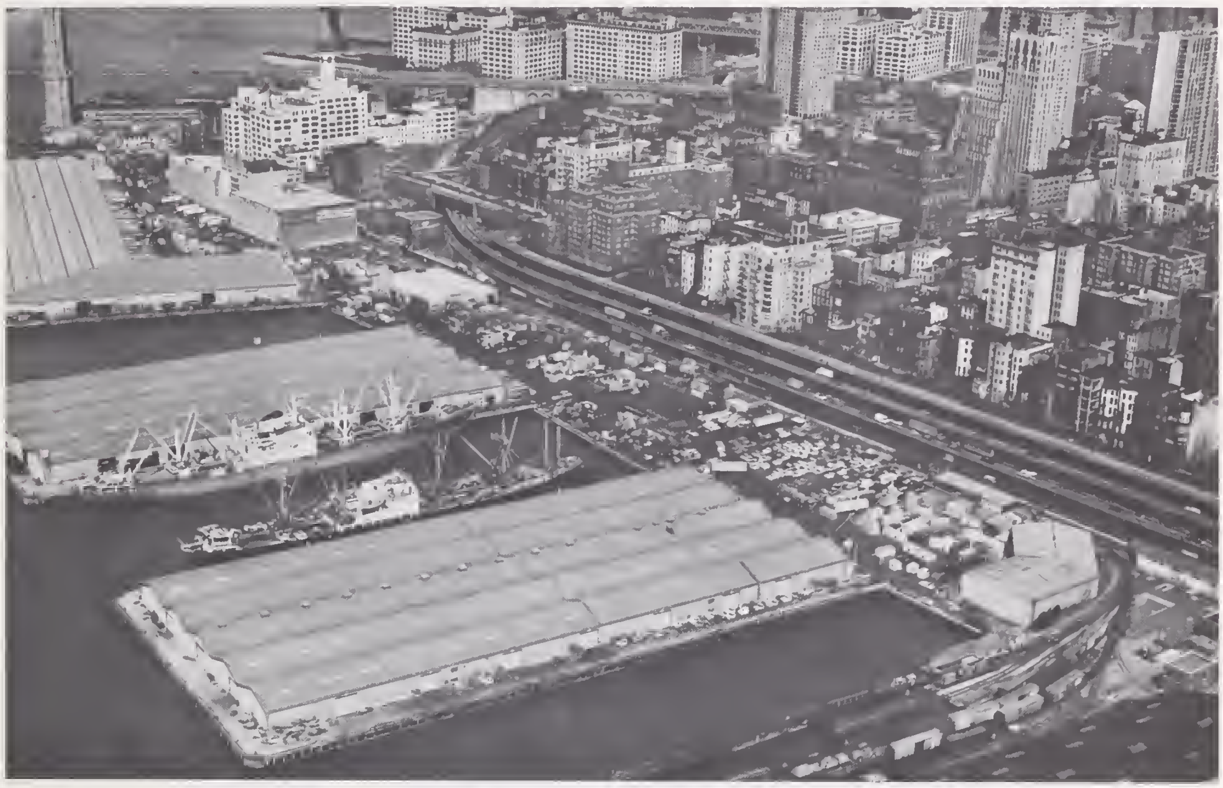
[a] Presumably in response to demand.

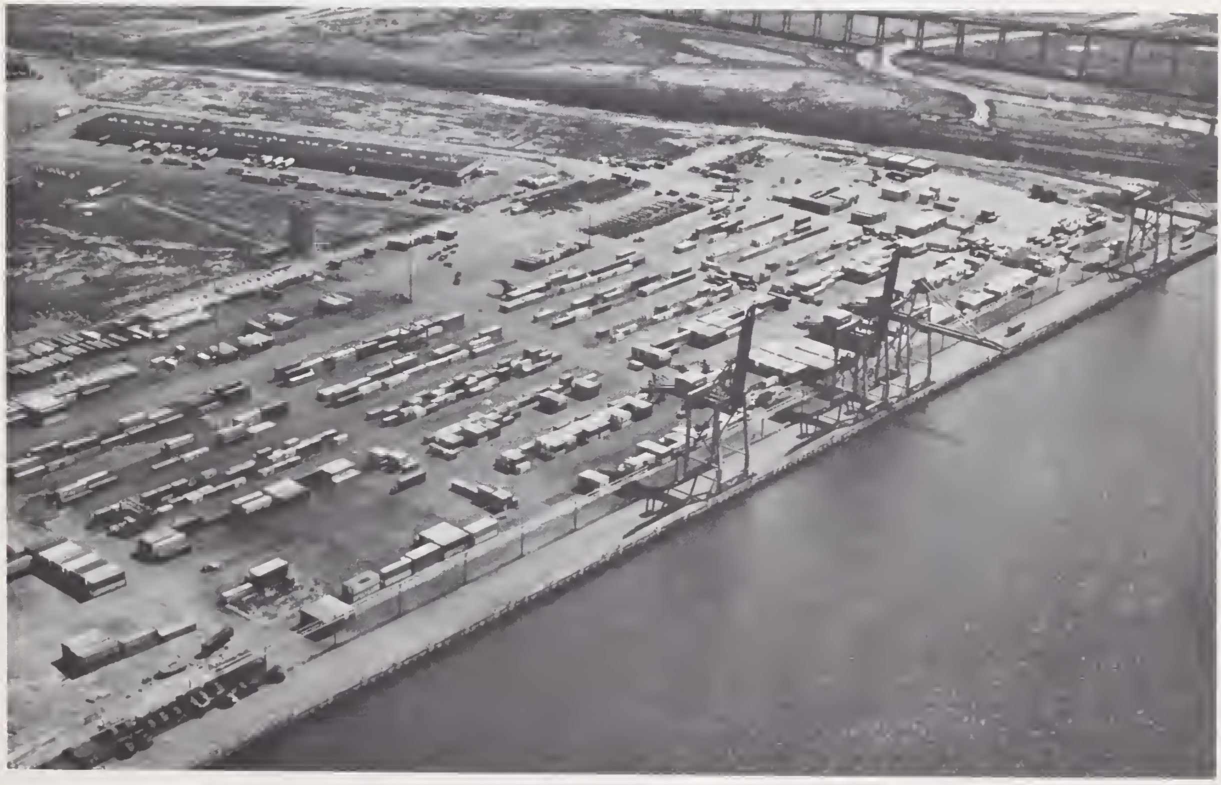
[b] Including other activities.

[c] To be operated by the Port Authority of New York and New Jersey.

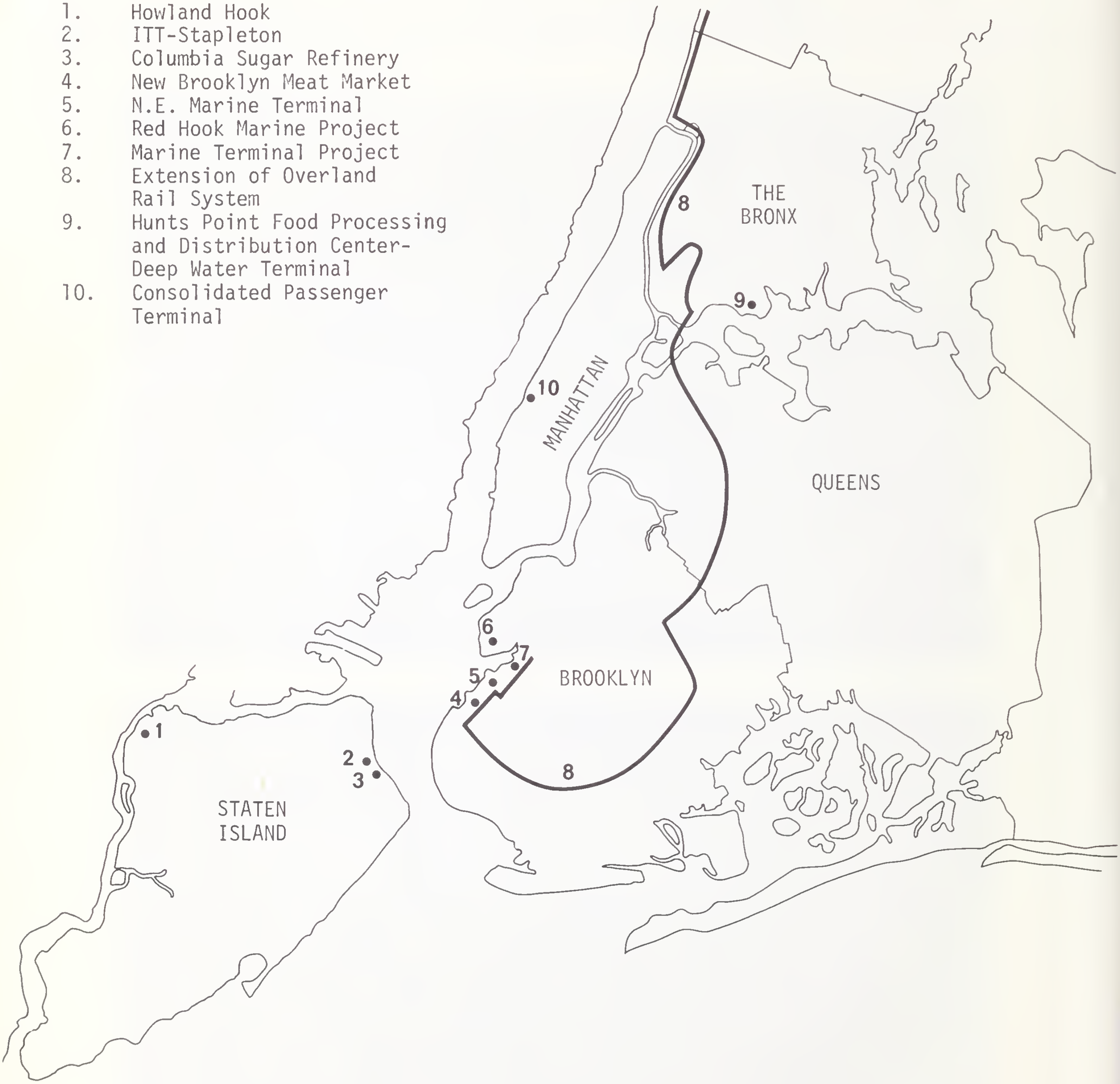
Source: Tri-State Regional Planning Commission.

Breakbulk operations continue at the piers just below the Brooklyn Heights promenade (top) while plans go forward to expand the Howland Hook Containerport (bottom). Brooklyn and Staten Island are the focus of City efforts to modernize port facilities.





1. Howland Hook
2. ITT-Stapleton
3. Columbia Sugar Refinery
4. New Brooklyn Meat Market
5. N.E. Marine Terminal
6. Red Hook Marine Project
7. Marine Terminal Project
8. Extension of Overland Rail System
9. Hunts Point Food Processing and Distribution Center-Deep Water Terminal
10. Consolidated Passenger Terminal



Benefits of the Shipping Industry

Measuring the benefits of the shipping industry to the City has always been difficult. The task is complicated because benefits are both direct and indirect, the latter including all the economic activity which clusters around an intensely used, competitive port.

Some 20 years ago, the Port Authority estimated that one of every four people in the district owed his or her job directly or indirectly to maritime activity. This study has been largely discounted, although no new comprehensive studies have appeared. Recent estimates of the ratio between direct and indirect job generation, which is the crucial factor, range widely - from 1:2 to 1:10. It is difficult to make accurate estimates because an undetermined proportion of cargo uses the Port simply as a way-station. This cargo, which neither originates nor terminates in the region, generates comparatively few indirect benefits.

New York City, as the office center of the region, is headquarters for many marine cargo-related offices. In fact, Lower Manhattan has become a center of world trade. Additional office space is taken up at the pier facilities themselves. Some industries such as container repair rely directly upon the existence of shipping for their continued operation.

Industry and wholesaling undoubtedly reap some benefit from the availability of a broad range of shipping activities and from the quality of service offered. (This benefit should not be overestimated, however, because many factors are involved in the City's competitive position.) The low-cost waterborne network is a significant advantage for industries requiring local bulk transport. For example, the construction industry's ability to barge sand and gravel keeps building costs lower than they would be otherwise.

The City's Port Development Program

Given the critical importance of Port activity, the City Department of Ports and Terminals embarked in the early 1960's on a strategy for revitalization, centering on the redevelopment of the Manhattan waterfront. The City spent $34 million in 1964 to rehabilitate the Chelsea piers. In 1965, $7.3 million was spent to build Pier 36 in the East River, one of the finest breakbulk piers in the country. Both piers fell almost immediately into disuse - and have remained idle.

Slow-moving breakbulk operations could not compete with containerization and such additional refinements as lash and roll-on-roll off.[5] With the enormous speed-up in turn around time for containerized ships (it takes only one day to load a 6,000-ton containerized ship, while it takes 12 days to load the same size breakbulk ship item by item), new facilities require good vehicular and rail access, specialized handling equipment, and substantial back-up space for containers - a requirement especially difficult to meet in Manhattan.

In recent years, the City has shifted its emphasis to building containerized facilities in Brooklyn and on Staten Island, which can compete with similar facilities on the New Jersey side of the Port, and to developing a coordinated waterfront terminal in the Hunts Point Market in the Bronx. Passenger cruise traffic will remain in Manhattan.

The Department of Ports and Terminals has begun an aggressive program of port development and redevelopment.

In Brooklyn, a comprehensive planning and implementation program is underway in Bush Terminal and Red Hook. The 500 acres of Bush Terminal currently used or under development for maritime commerce include the waterfront area from the Bay Ridge Yards north to Hamilton Avenue. Originally planned as a separate development, Bush Terminal has been incorporated into the Northeast Marine Terminal.

Red Hook Containerport will be a modernized facility for the handling of both breakbulk and containerized cargo. Direct rail access will be provided to the containerport and to the Port Authority piers immediately to the north. The City will invest about $30 million in capital funds in the project, as well as additional funds for relocated community facilities.

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[5] LASH is a type of ship which carries actual barges on board, each barge loaded with containers. These barges can be unloaded at sea and delivered to their final destination by tugs, thus allowing the benefits of containerization in areas without the necessary water depth.

ROLL-ON-ROLL-OFF is a technique whereby vehicles drive directly onto the ship and, in the case of trucks, the cabs detach from the trailers and drive off, leaving the container aboard ship. At the ship's destination, vehicles are driven off, or cabs drive on ship, pick up their trailers, and drive off. In this way the need for huge cranes is eliminated.

The Northeast Marine Terminal and Red Hook projects integrate the new facilities with the local community, provide for adequate intermodal interface, and often include industrial development dependent upon maritime access.

Staten Island's potential for modern maritime activity is just being tapped. In the Stapleton area, the City has approved the construction of a sugar refinery with an annual capacity of 800,000 tons to which bulk deliveries will be made by ship. Also in the Stapleton area, ITT has developed a roll-on-roll-off container facility with regular runs to Puerto Rico. The City has purchased the Howland Hook containerport, formerly run by American Export Lines, plus an additional 330 acres of undeveloped upland. The containerport has been leased to U.S. Lines, which expects to move 180,000 containers annually. The upland area will be developed by the Howland Hook Development Corporation for port-related activities such as warehousing and distribution. With maximum development, 18,000 jobs could be created by the containerport and its nearby upland area.

Hunts Point

In Hunts Point, the City has leased a portion of the Hunts Point Food Center area to a private developer who will construct a deep-water cargo facility. Imported frozen meats will be shipped in by water and stored at the nearby refrigeration facility. The Hunts Point project will also accommodate lash. The City will provide capital funds for site development; the lease revenues will cover these costs. All other costs will be borne by the private developer.

The older piers used throughout the City for breakbulk freight have experienced such a decline in activity that many on the West Side of Manhattan are now being used for other purposes, such as storage, bus parking, the City's car towaway program, freight forwarding, and recreation. Shippers have been unwilling to gamble with a vertical containerport in the Chelsea area, preferring the container facilities with greater land area elsewhere. However, the use of the Chelsea piers is being re-evaluated in the light of possible re-routing of the West Side Highway, and the possibility of using these piers for maritime or other job-generating activities is being re-assessed.

East River piers are used for a heliport, public parking, Statue of Liberty tours, tennis facilities, the South Street Seaport Museum, impounded cars, a seaplane, and recreation, as well as various concrete companies, a few remaining shipping operations (Netumar and Standard Fruit), and the remnants of the Fulton Fish Market, soon to be relocated to Hunts Point.

Among industries dependent on waterborne transportation are 32 sand and gravel plants, such as the one on the Harlem River.

Financing Port Facilities

The Department of Ports and Terminals, a division of the Economic Development Administration, has over-all responsibility for the planning and development of municipal port facilities. Funds for these activities are provided in the Capital Budget. Unlike the City's industrial renewal program, which only funds site acquisition, Ports and Terminals can fund all phases of development from acquisition through construction.

These projects often receive partial exemption from the City's General Debt Limit, to the extent that they are self-supporting.[6] Ports and Terminals' Northeast Marine Containerport has been given a 75 per cent exemption, the Red Hook Containerport 22 per cent, and Howland Hook 75 per cent. The small exemption given to Red Hook reflects the heavy capital investment required for site acquisition, relocation, replacement housing, and community recreation space. Only the principal and interest on the actual construction of the containerport are covered by the lease with the Port Authority.

Lease terms for municipal containerports generally call for payment of a set fee plus a percentage of the actual cost of construction. The Red Hook lease also requires payment of a percentage of profits.

Since these projects are always built to the specifications of a prime operator or lessee, the lessee will often construct the facility and receive direct reimbursement from the City. The fixtures and improvements revert to the City upon expiration of the lease - which generally runs from 30-50 years.

The Port Authority's financing of new facilities comes primarily from the issuance of bonds. These bonds are not backed by the taxing powers of the States, but by the expected revenues produced from Port Authority facilities. Port Authority bonds are exempt from Federal income taxes, as is the Port Authority's income. The Port Authority makes payment in lieu of property taxes to various municipalities and agencies as authorized by New York and New Jersey.

Industries Shipping/Receiving Goods by Water

Traditionally, industries shipping or receiving goods directly by water have been "basic processing" industries, which initially process bulk materials. To such industries, the low cost of water transport has been extremely important. Although basic processing industries helped lay the foundation historically of New York's economy, they have largely left the City in recent decades. However, as of 1971, there were still 32 gravel plants and 21 asphalt plants on the shoreline, and major areas were used for barge deliveries of meat, ink, newsprint, and building supplies.

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[6] The City debt limit is an amount equal to 10 per cent of the most recent five-year average of the City's full value of taxable real estate.

An example of waterfront industry is the Colonial Sand and Stone Company on the East River, which is dependent on the shoreline for its barge deliveries of sand and gravel and which must be located within 30 minutes of the construction sites in the central business district served by its trucks. Such locational constraints, as well as large-tract land availability or highway and/or rail access, limit the number of possible sites for industry on the waterfront.

The following are other companies shipping or receiving directly by water:

Brooklyn - Kentile (manufacturer of tiles) and Goya Foods in the Gowanus area; Sucrest Sugar; F & M Schaefer Beer Company; Domino Sugar; and Lumber Exchange Terminal, Inc.

Queens - The Daily News receives deliveries of newsprint via a float operation and has plans to develop a plant in the Hunters Point area to receive paper by direct water shipment; Pepsico; an asphalt plant in Whitestone.

Staten Island - The Columbia Sugar Refinery is in planning. According to EDA, the refinery will be the first such facility constructed in N.Y.C. since 1903, will produce 400,000 tons of refined sugar annually, and will bring 300 new jobs to Staten Island. A deep water port will provide marine access, and truck and rail will be used for regional distribution.

Bronx - In the Hunts Point area, a planned deep-water facility will receive frozen, imported meats for storage in a refrigerated warehouse facility. Imports are expected to reach 600,000 tons per year; all of this is new tonnage reaching the City.

Both the Staten Island Industrial Park and the College Point Industrial Park in Queens have water access. However, it is not known whether industries locating in these areas will choose to ship directly by water. In industrial areas on the waterfront, it is the exception rather than the rule for an industry to ship by water.

There are liquified natural gas tank farms in Staten Island, Brooklyn and Queens, all with water access for tanker or barge deliveries. The danger of fire or explosion is a major concern in siting these facilities, although the danger can be eliminated with stringent enforcement of government regulations on structural design, careful guiding of tanker navigation, and proper location and construction of tank farms. Since the use of imported liquified natural gas is expected to increase by 1980, additional facilities will be required and siting them will obviously require careful consideration.

Approximately 76 per cent of the metropolitan area's fuel is provided from petroleum products, most of which is imported.

Petroleum transfer and storage depots, located in all five boroughs, have water access with few exceptions. Deliveries come by tanker; long-haul transfers are made to barges or tankers, short-haul transfers to tanker trucks. Total storage capacity of these depots is approximately 440 million gallons of heating fuels and 112 million gallons of gasoline.

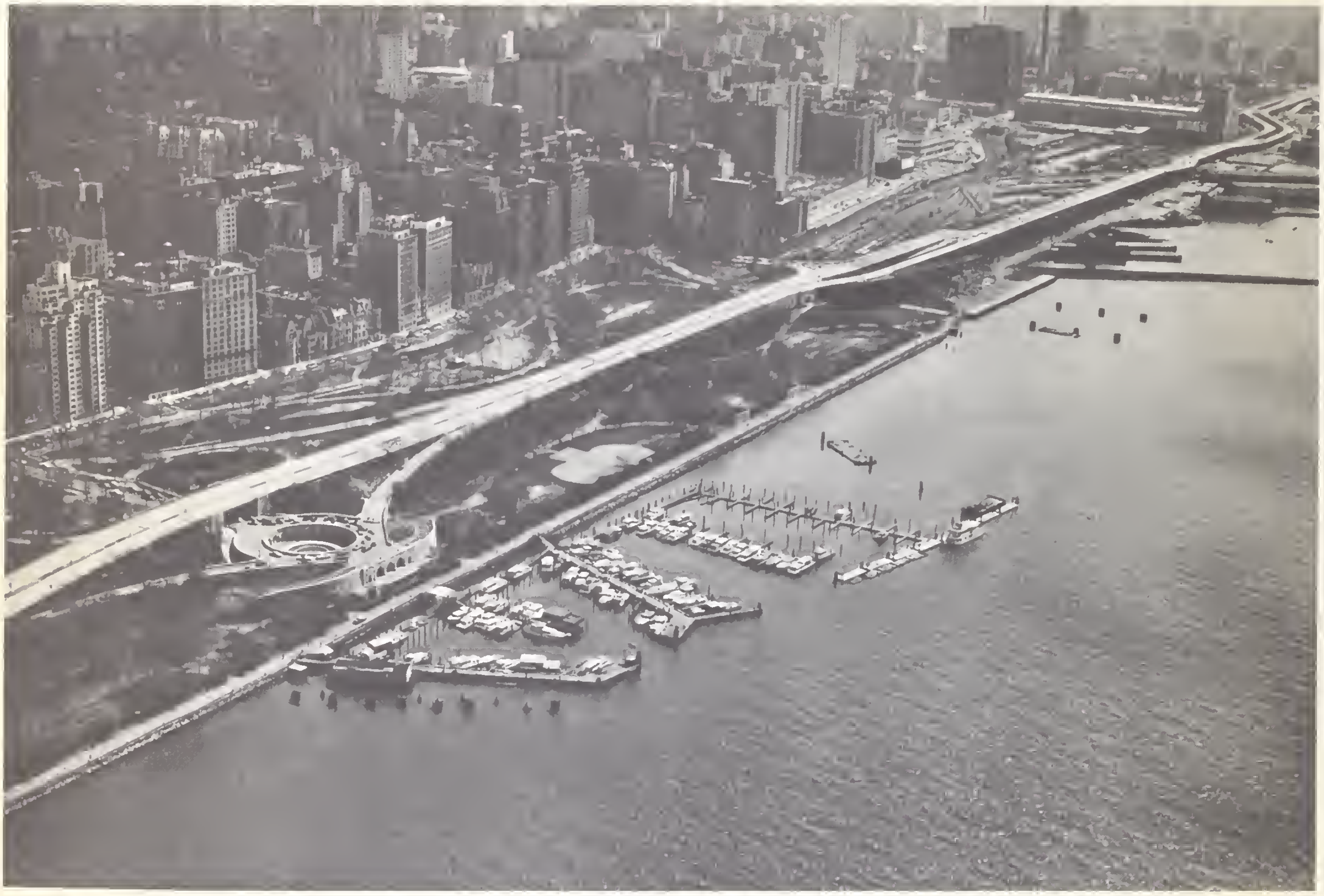
ACTIVITIES WHICH REQUIRE DIRECT ACCESS TO THE WATER, NOT FOR THE TRANSPORT OF GOODS

This category includes passenger cruise operations, passenger recreation facilities, such as the Circle Line tours and marinas, and shipyards, such as Todd Shipyard in Brooklyn and the Seatrain Shipbuilding Corporation in the Brooklyn Navy Yard.

Shipbuilding continues to thrive. There are two types of shipyards in the City: those handling commercial and governmental craft, usually over 50 feet in length; those handling private recreational craft, which is usually connected to a marina.

Passenger Ship Terminal

The cruise market in New York in recent years has been exhibiting some shakiness, as trans-Atlantic liners have died off and New York-based Caribbean cruises face increasing competition from "fly and cruise" packages out of Southern ports. Nevertheless, the City is committed to holding and strengthening its cruise market. A superliner terminal on Manhattan's West Side is now being developed by the Port Authority. The new Consolidated Passenger Liner Terminal will provide a 9-berth facility involving Piers 88, 90 and 92 and their connection by terminal vehicle ramps and passenger walkways will be completed this



There are more than 100 marinas and 34,000 registered boats in the five boroughs. Manhattan's 79th Street Boat Basin is one of the oldest.

year. No reconstruction will take place on Pier 40, a three-berth, box-pier facility. Access to the terminal will be provided via ramps from West Street for automobiles, and directly from 12th Avenue for buses and trucks.

Capital funds have been provided by the City ($30 million) and the Port Authority will pay a basic rental sufficient to allow the City to amortize its investment over 20 years as well as covering the interest charges on the debt with full debt service coverage.

Although the regional economic impact of the terminal has not been assessed, a study was done on the economic impact of passenger shipping in New York in 1965 (when there were 870,000 passengers). The direct impact then on the regional economy was approximately $137 million, which includes salaries, goods and services purchased by the shipping lines and goods and services purchased by passengers in the City. The secondary impact was approximately $274 million (using a regional multiplier of two to one).

Circle Line

Locational requirements for passenger facilities differ from those of shipping facilities: the passenger center should be readily accessible to hotels, major stores, and passenger transportation. The City's best-known private marine sightseeing tour, the Circle Line, operates out of Pier 83 on Manhattan's West Side, where it is accessible by bus, taxi and private automobile from midtown hotels and terminals. The Hudson River Day Line operates from a nearby pier, while Statue of Liberty trips are made from Battery Park at the tip of Lower Manhattan.

Elsewhere in the City, Rockaway Boat Lines, Inc. operates a seasonal service from Sheepshead Bay to Breezy Point and tours of Jamaica Bay.

Marinas

A marina is a miniport servicing private leisure craft. Marinas are the prime commercial recreation ventures of shore areas, and there are more than 100 marinas in the five boroughs. In the last quarter century, these facilities have been supported by the growth of the affluent metropolitan and suburban population. There are 34,000 boats registered in the City, which ranks first among the top 15 metropolitan marine sales markets in the country. The minimum total gross of local marinas is estimated at $20 million annually.

Boat basins dot the coastlines of the metropolitan area outside of Manhattan. City Island, a major yachting hub originally directed at business on nearby Long Island Sound, is the home of two leading sailmakers, of five historic yacht clubs, and of some 27 marinas, shipyard and boat-related facilities. The American Cup winner "Intrepid" was built at the Minneford Yacht Yard. Leisure boat basins are prevalent on the south Brooklyn shores of the Rockaways and Jamaica and Sheepshead Bays.

"Marinas of the Future" in Flushing, Queens is an exceptionally large facility, covering 44 acres of upland, with a mile-long dock network in a deep bay accommodating 490 boats. Operated as a concession from the City, it includes repair and storage facilities, boat and marine supply outlets, and a full complement of facilities for the boatman ashore.

In recent years, New York City has seen new marina developments lag behind in healthy growth in boat sales. The City, working through the Parks, Recreation and Cultural Affairs Administration, has assisted some new ventures and supported older operations. Staten Island's 300-berth Great Kills marina is a new assisted facility; the 200-berth 79th Street Boat Basin, Manhattan's major marina, an older assisted operation. Public initiative, however, has only partially filled the gap. In fact, due to the tremendous regional demand flowing to New York City, the market for berths alone in 1973 was characterized as "unlimited" by public and industry specialists. Future marinas are expected to follow certain trends:

1. Larger marinas will be more carefully located in market areas with pent-up demand;

2. Marinas will be more standardized in size and components to permit services to modern vessels;

3. Boat basins will be increasingly combined with other uses, especially housing;

4. Hydrographical conditions and regulations affecting waterfront use will be improved;

5. Government financial support in planning and development of infrastructure for specific facilities may be increased.

INDUSTRIES USING ESTUARINE WATER FOR PROCESSING

Several industries, such as electric steam plants, gas reprocessers, asphalt plants and sugar refineries, utilize large amounts of estuarine[7] water in their plants for cooling purposes. Because heated water is then usually discharged, these industries have become the object of considerable attention from environmentalists and government officials. In some cases, alternative industrial methods have been worked out to preclude thermal pollution. For instance, the projected Columbia Sugar Refinery on Staten Island, unlike most other sugar refiners, will use water from the City water system for its cooling process and will discharge heated water into the City sewer system.

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[7] Estuarine water is fresh water mixed with tidal waters.

This type of solution frees some industries from the necessity of locating on the waterfront. While a comprehensive list of industries which discharge heated water is not yet available (a permit program will be completed by the end of 1974), the number of such industries is believed to be small, and no major growth is expected in the future. However, power plants are an exception to this trend.

Under a Federal, State and City program, active industrial polluters of the waterways are now in a mandatory program of abatement. It was feared that surcharges placed upon industries, depending upon the quantity and quality of the pollution discharged into the sewer system, would create an additional, unbearable financial burden for the City's industries. There is a difference of opinion on the extent to which this has occurred.

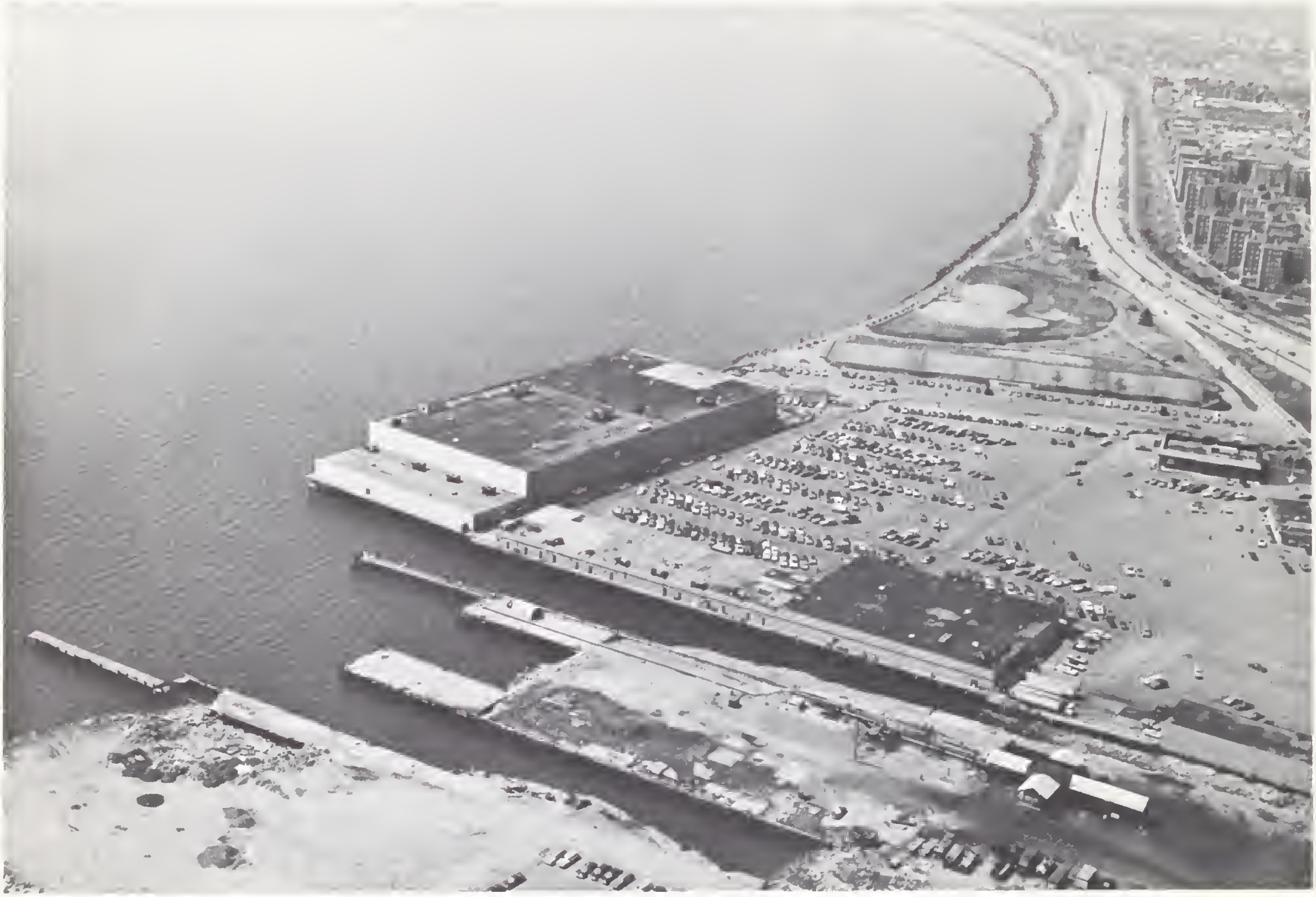
ACTIVITIES ATTRACTED TO THE WATERFRONT AND/OR WATERFRONT INDUSTRIES

Airports do not absolutely require waterfront sites but such locations offer many conveniences - not only because large tracts of inexpensive land are often available but because it is easier and safer for planes to land and take off near water than over built-up land. Noise pollution is also lessened.

Petroleum transfer facilities locate near the shore in order to minimize transport costs. Pipelines might reduce or eliminate the need for these facilities.

Many economic activities find themselves on the shoreline because they must be near industries which require waterfront locations. These accessory uses include satellites of airports (air freight forwarders, hotels, caterers) and of shipping (container and engine repairers, weighers of equipment).

Staten Island, through planning, has provided land near its major shipping centers to accommodate activities which serve or are supported by its maritime activities. In other boroughs, however, the needs of accessory industries are sometimes difficult to meet, with the result that they may spill over into residential neighborhoods. This issue is now being studied by the Department of City Planning.



Korvette's at Bay Parkway in Brooklyn is directly on the water but, like other shopping centers, faces inland toward its parking lot and highway traffic.

ACTIVITIES LOCATED ON THE WATERFRONT FOR MISCELLANEOUS REASONS

While many activities, such as offices, stores and restaurants can enjoy the benefits of visual access to the waterfront, few such activities depend on such a location. In fact, a developer may choose not to use the waterfront amenities if the resulting site design would interfere with other commercial needs.

A retail complex locates on the waterfront for one of three reasons: 1) to serve housing located on the waterfront; 2) because major highways and available land are located there; 3) to give the facilities a special atmosphere, enhancing their appeal.

Recent developments of large-scale residential projects provide several examples of retail facilities serving waterfront housing. At Waterside, there is an elevated riverfront plaza containing 50,000 square feet of retail space, with a 16,000 square foot sea food restaurant facing the water. Commercial space in Battery Park City will be oriented toward upland customers in the Lower Manhattan offices as well as to residents.

Regional and community shopping centers are usually located on the shoreline to be proximate to highways and to take advantage of vacant land. A regional center generally has two or more department stores situated at the ends of a pedestrian mall lined with satellite stores; the average is 1 million square feet of retail space. A community center has a supermarket and a discount store, with a few satellite stores, all facing on a parking lot; retail space averages 250,000 square feet.

Regional and community centers generally ignore the aesthetic potential inherent in a waterfront site but the reasons are sound and economic. It is not efficient to line pedestrian malls with stores on one side only, leaving the other open to the water, because customers would have to walk twice as far to pass the same number of stores. The stores of a community center must face onto the parking lot and the highway because visibility from the road and the lot is important to the merchants' business. Shoppers cannot be given water vistas from within stores either because merchants use the rear of their stores for servicing and storage; underground servicing and storage facilities are expensive to provide. Department stores do not have windows other than those for exterior displays because the wall space is needed for interior displays and open storage of the merchandise and because windows present security and maintenance problems.

The Korvette's community shopping center at Bay Parkway in Brooklyn is an example of a shopping center located on waterfront land. Korvette's located there because the site is at Bay Parkway interchange of the Shore Parkway and because the land was available. The center is oriented away from the water; if it were not for the smell of the salt air, shoppers would be unaware that they are on the sea.

The disadvantage in a waterfront location is that a shopping center can only draw customers from one side rather than from all directions.

Fashion Centers

There is one type of regional shopping center, called a fashion center, which is smaller than the average regional center and which caters to affluent shoppers by selling expensive merchandise in an elegant environment. It is conceivable that this type of center could afford to utilize the aesthetic potential of a waterfront despite its diseconomies. However, this type of center has been built almost exclusively in high-income suburban areas rather than within the City.

In special circumstances, retail facilities are drawn to a waterfront location to take advantage of the special atmosphere it affords. The prime determinant is "image". For example, in the commercial development proposals for Manhattan Landing, plans have been approved for a two-story arcaded gallery of restaurants and small shops at the end of South Street facing the South Street Seaport complex. The gallery will serve visitors to the Seaport as well as Manhattan Landing residents. This same rationale is behind the planning for St. George in Staten Island. Proposals have been made to develop a sizable waterfront commercial complex comparable to San Francisco's Ghiradelli Square there (as well as in the Fulton Ferry district of Brooklyn). The idea is to capitalize not only on the new housing in the area and St. George's location as Staten Island's "downtown", but also to promote the image of a tourist-recreational complex tied with views of the ferry and the water.

Reasons for Siting

Although economic activities located on the waterfront for historical and/or miscellaneous reasons do not require a shoreline location, they were not sited for random reasons. Their locations were chosen because of ready access to nearby downtown areas; the low cost of land and buildings; the availability of large tracts of land; highway and/or rail access; or a multitude of historical reasons which no longer apply, such as a plant which used to receive goods by water and no longer does. Despite this, most firms in this category cannot relocate from their present sites because new space would be too costly. Therefore while the City has followed a policy of phasing out marginal economic activity in some areas where they pre-empt waterfront land needed for other vital uses, the City is also concerned with the need to protect viable industries on the waterfront.

Each case should be weighed carefully; if relocation is not feasible or desirable, jobs may be permanently and unnecessarily lost.

Anti-Industrial Pressures

In some sections, such as the East River industrial band (from Bay Ridge in Brooklyn to Hunter's Point in Queens), new economic investment - both public and private - continues to renew the waterfront for the economic benefit of the City. In other areas, the future is more problematic. Two examples of such areas are:

Tribeca Waterfront -

The Tribeca District on Manhattan's West Side is sandwiched between Canal Street and Vesey Street, Broadway and the Hudson River. The area is characterized by small businesses (predominantly warehousing, light manufacturing, and the graphic arts industry) occupying older buildings. In recent years there has been both a decline of employment and an influx of artists attracted by low-rent lofts.

The northwestern corner of Tribeca on the waterfront near the Holland Tunnel now functions as a relatively low-density warehousing and support service district for central business district activities. Tribeca is now being intensively studied to determine whether changing activities in nearby areas (e.g. Washington Street Urban Renewal Area, the proposed West Side Highway development and other shifts in development) will increase competitive development pressures in Tribeca.

Chelsea Triangle -

The Chelsea Triangle, bounded by 14th and 23rd Streets, Tenth Avenue and the River, lies to the west of a residential district and to the east of piers which may become active centers. The triangle itself is a relatively low-density district providing low-cost space to the major activities of the area - primarily "For Hire" trucking firms that provide delivery of goods or services to the central business district. If residential development to the west successfully creates pressures to expand into the triangle, the activities now located there would almost certainly be forced out. Finding a suitable relocation area which provides good CBD access with low-cost space would probably be a major problem for the trucking firms located there.

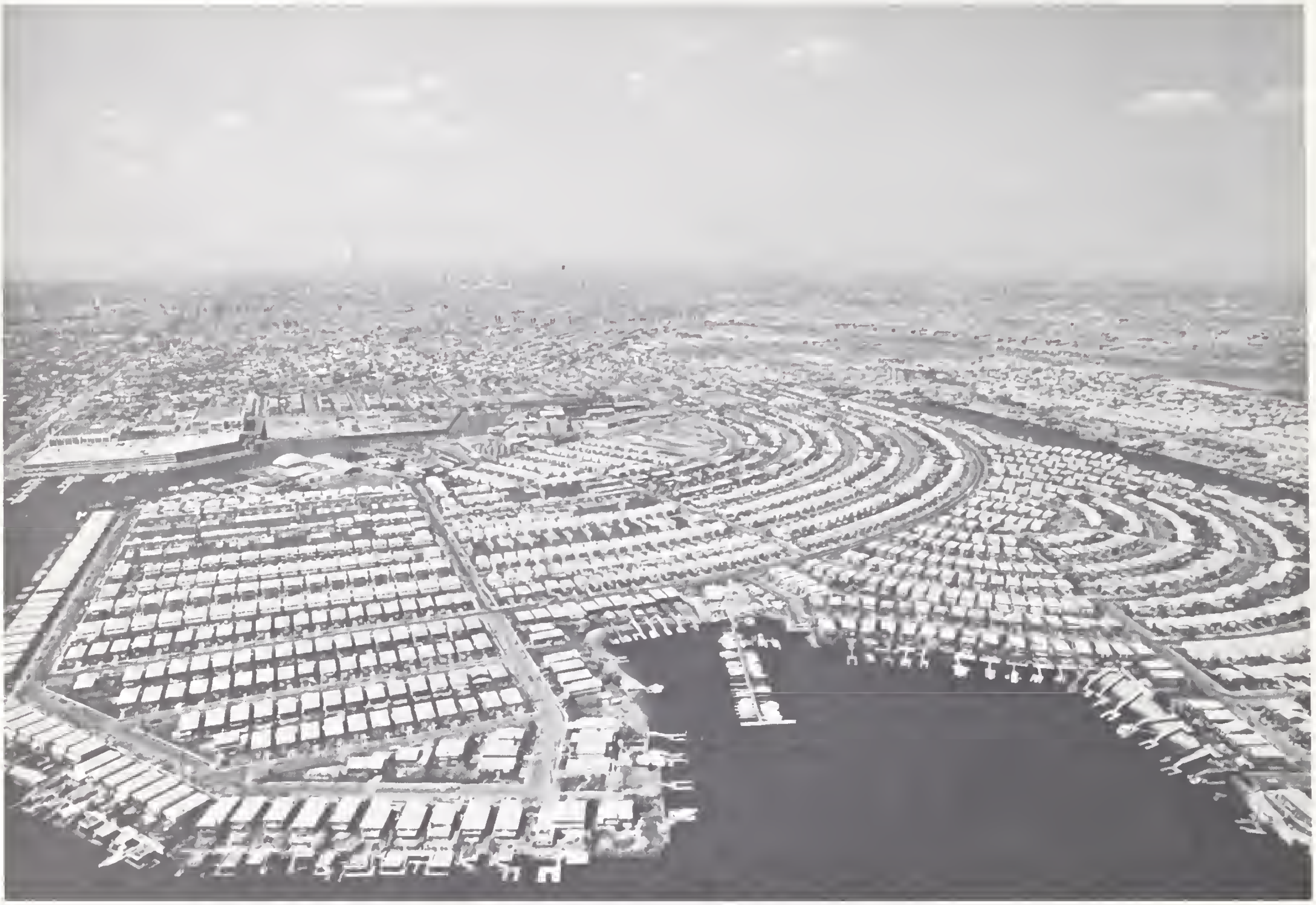
- Should housing be encouraged on the waterfront?

- What forces are causing new housing development to concentrate on the waterfront?

- Should waterfront housing receive a priority for available subsidy funds?

- What public benefits can be achieved through private development of waterfront housing?

- How can housing best relate to a waterfront location?

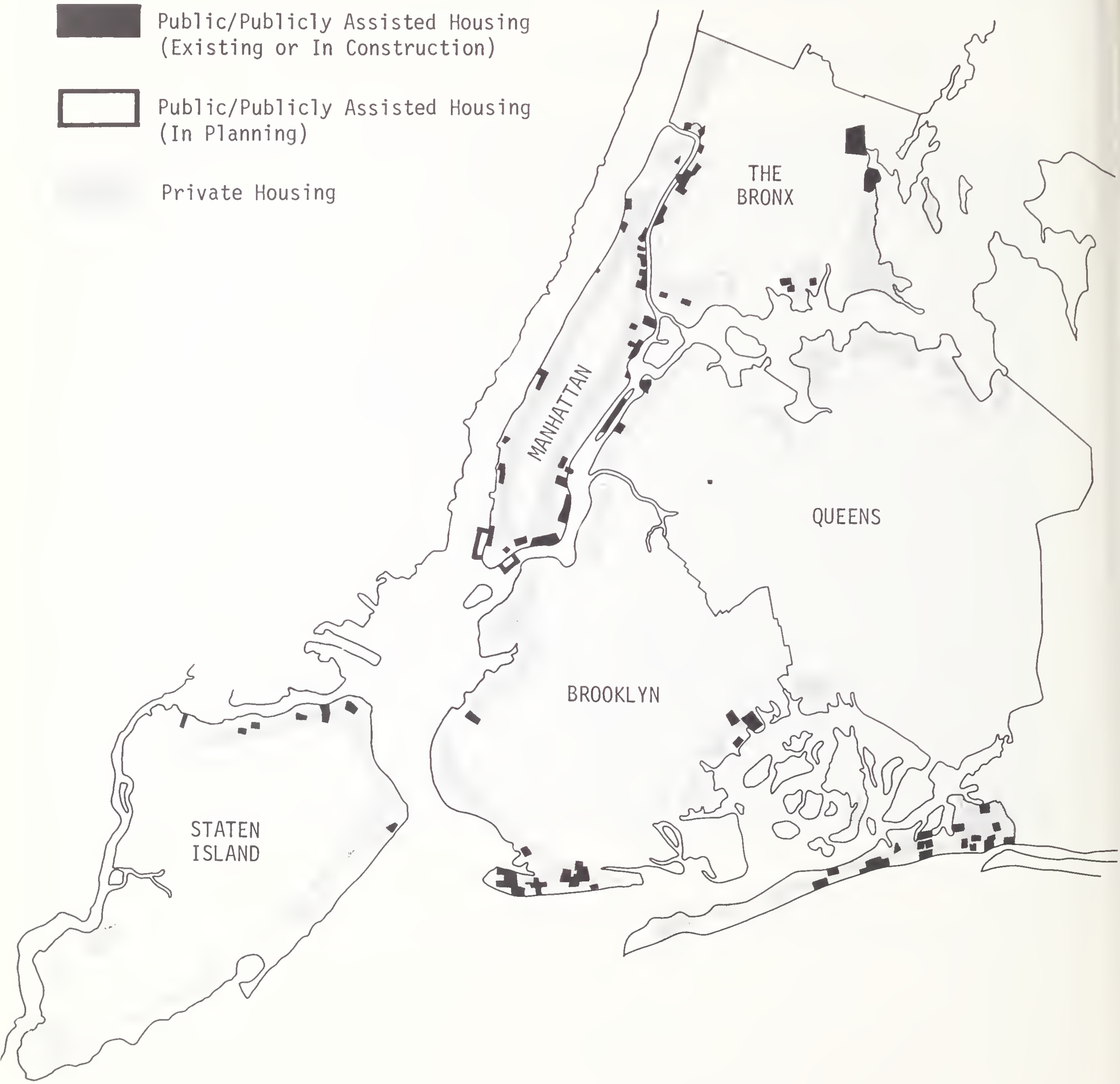


HOUSING:

In Mill Basin, Brooklyn, many private houses on the lagoon have their own boat docks but upland homeowners and the public have only limited access to the shore.

New York City's vacant, abandoned or underutilized shoreline offers many opportunities for new housing and planned communities.

The major hindrance is the lack of subsidy funds to bring rents down to reasonable levels. Nevertheless, it is important that public policy be formulated to guide waterfront development. Indeed it is imperative, since waterfront housing will, for the most part, proceed largely with public subsidy.


Public/Publicly Assisted Housing (Existing or In Construction)
Public/Publicly Assisted Housing (In Planning)
Private Housing
THE BRONX
MANHATTAN
QUEENS
BROOKLYN
STATEN ISLAND

PATTERNS OF WATERFRONT HOUSING DEVELOPMENT

Waterfront housing ranges from single-family homes to high-density apartment towers. The shoreline involved is equally variable - rivers, sounds, bays, and the Atlantic Ocean. In many cases, the relationship between the housing and the waterfront is far from close.

This may be the result of topography, as in the Riverdale section of the Bronx, where housing is built on cliffs overlooking the Hudson River. Sometimes the separation is a legacy of history and the days when industry monopolized the shoreline. For example, Tudor City, built in 1928, presents a virtually windowless facade to the river because slaughterhouses and generating plants lined the shorefront from 40th Street to 43rd Street.

Shoreline highways are a common barrier: the Franklin Delano Roosevelt Drive on the East River not only cuts off adjacent low- and middle-income developments from the East River Park, but interferes with the view from all but upper floor apartments. Houses along Brooklyn's Shore Parkway have unobstructed views but limited physical access to the water. On the north shore of Staten Island, Castleton Park, North Shore Plaza, and Richmond Terrace Houses also lack a functional relationship to the waterfront but do have the advantage of cool breezes and good views of Kill Van Kull.

On the other hand, the Henry Hudson Parkway has not prevented residents of Manhattan's Riverside Drive from easy access to Riverside Park, which runs from 72nd to 129th Streets. Here the topography - the high ground of Riverside Drive - yields spectacular and unobstructed views. Several housing developments north of the Queensboro Bridge along the East River are similarly well situated to take advantage of their waterfront locations. Queensbridge Houses and Astoria Houses, for example, have promenades and direct access to waterfront parks.

Decking sometimes relieves the problems posed by shoreline highways. The East River Drive is decked at Sutton Place and at Gracie Square. Carl Schurz Park extends over the Drive from 84th to 90th Streets. The Brooklyn Heights promenade is built over the Brooklyn-Queens Expressway.

In former resort areas, such as Coney Island and the Rockaways, housing is usually built right along the beach. Prominent among recent Coney Island developments are Brightwater Towers, a Mitchell-Lama development on Surf Avenue, Coney Island Houses and Bernard Haber Houses, fronting on the boardwalk.

The construction of large public and publicly aided housing projects which have dramatically altered Coney Island and the Rockaways is simply the latest of many changes along the waterfront. In Coney Island, hotels gave way to recreational facilities when the building of the subway allowed families to make single-day excursions to the beach. But time took its toll of the amusement park. Some sections, destroyed by fire, were never rebuilt. Others became the sites of housing developments. In the Rockaways, high-rise public and publicly aided housing have replaced hotels and run-down summer bungalows. Roy Reuther Houses is one of the few recent high-rise publicly aided projects that relates directly to the waterfront. This 900-unit complex for the elderly includes open and enclosed sitting areas and walkways to the beach.

Private Homes with Docks

In several neighborhoods, private homes take full advantage of the waterfront. In Mill Basin and on Gerritsen Beach in Brooklyn, single- and two-family houses have private boat docks; so do many houses on Eastchester Bay and City Island in the Bronx. Large, single-family homes in the upper-income neighborhoods of Malba, Whitestone, Douglaston, and Bay Terrace dot the shoreline in northern Queens. In southern Queens, many homes on Broad Channel along Shell Bank Basin and Hawtree Creek have private docks.

In a City as densely populated as New York, provision of open space and recreational amenities is crucial, and waterfront projects offer a unique opportunity to integrate housing with public recreational facilities. Developments where special planning efforts have been made to take full advantage of the water are few and relatively recent: Waterside, Manhattan Landing and Battery Park City in Manhattan, Harlem River Park Houses in the Bronx, and St. George Place in Staten Island.

Built on a six-acre platform over the East River between 25th and 30th Streets, Waterside has four residential towers with 1,460 units. The development provides recreational and shopping facilities for residents and a public waterfront esplanade. An existing overpass to the southern end of the development will soon be supplemented by a second overpass to be built at the northern end.

Still in planning, Manhattan Landing and Battery Park City will be much larger and more diversified. Manhattan Landing, to be built by private developers on a 113-acre site along the East River, will provide some 30 acres of public recreation space, including a waterfront promenade, as well as 6,400 apartments, office space, shopping and cultural facilities.

On the Hudson

Battery Park City will be built on some 100 acres of land along the Hudson River between Battery Park and Duane Street. A city within a city, the development will ultimately include some 14,000 dwelling units, 5 million square feet of office space and 1 million square feet of retail space. It, too, will provide approximately 30 acres of open space, including a waterfront esplanade linked to Battery Park. In addition, the feasibility of a new "people mover" system is being investigated, which would link Manhattan Landing and Battery Park City and provide a Lower Manhattan loop service.

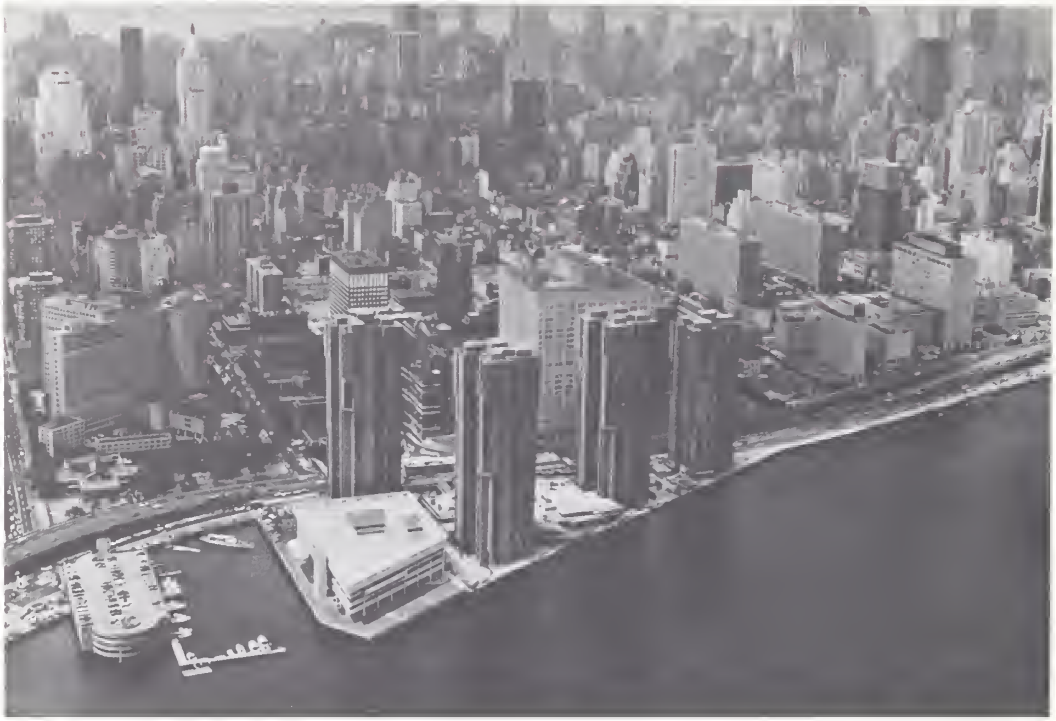
A "new town in town," sponsored by the State Urban Development Corporation, is now under construction on Roosevelt Island. When completed, the development will include 5,000 apartments, some 40 acres of parkland, a shopping arcade, and commercial space. Some of the apartments will have spectacular water views but the buildings were designed to turn inward on quadrangles in order to achieve a more domestic scale.

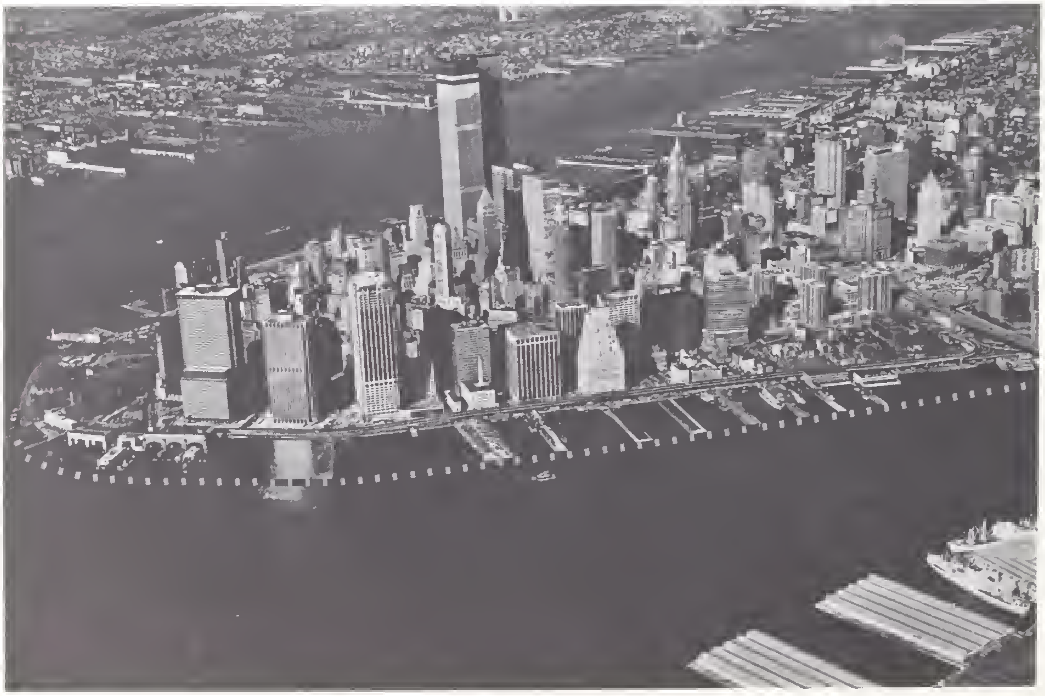
Harlem River Park Houses, a 1,650-unit development by the Urban Development Corporation on six acres along the Harlem River, is adjacent to a 25-acre State park with ballfields, picnic areas, plazas and play areas. Like Waterside, it is separated from the upland community by highways.

Staten Island

With some 2,700 units, St. George Place will combine apartments with commercial space and public recreation facilities - including an esplanade and plaza, a recreation pier with tennis courts, playgrounds, a fishing dock, sitting and picnic areas. The development will be the nucleus of a revitalized downtown shopping center.

Waterside (top) is the first large scale residential development to be built in Manhattan up to the pierhead line. Its East River platform measures 6.1 acres. Plans for Manhattan Landing (bottom) call for a 113 acre East River platform.





All these developments take advantage of waterfront locations. They contrast sharply with such developments as Co-op City, which is built along the Hutchinson River in the Bronx. Although the 15,000-unit project has more than 240 acres of open space and many recreation facilities, none relates to the waterfront, which is currently undeveloped. The high cost of bulkheading the river has so far prevented granting of the community's request for a waterfront park and esplanade.

THE ECONOMICS OF WATERFRONT HOUSING DEVELOPMENT

Waterfront housing development, while expensive, is in many areas economically competitive with inland development. Since much waterfront land is vacant and City-owned, there are usually no acquisition, demolition, or relocation costs. But site preparation can eat up these savings.

Costs vary greatly from site to site. The economic feasibility of developing any particular waterfront site may include the availability and price of land in adjacent areas, as well as infrastructure requirements. The high cost of site preparation in Lower Manhattan, for example, has not prevented new projects. The same costs in less densely populated areas might squelch development.

Preparing a waterfront site for development begins with a choice between landfill and decking. The choice depends in part on the depth of water at the site, the availability and quality of fill, and the potential effect of fill on river currents. Landfill usually involves excavating mud from the river, placing the fill, and building rip rap or a retaining wall to contain it. If high-quality fill is not used, drilling may be necessary in order to sink the foundation piles. Such drilling can triple costs.

For large housing structures, platforming has the major advantage over landfill of being considered, for tax purposes, as part of a building and, as such, a depreciable item. Moreover, platforming can be phased, whereas fill must be completed before construction can begin. The time lag with fill, which can be as much as a year to 18 months or longer, is expensive given the continuous escalation of construction costs and the rent forfeited. Landfill requires no maintenance, but platforms can present below-deck fire hazards and require maintenance. The need to inspect platform systems facilitates the prompt detection of deteriorated piles. On landfill sites, pile corrosion cannot be detected until settlement occurs, by which time remedial measures can be involved and expensive.

Both at Waterside and at Manhattan Landing, platforming proved to be more economical than fill, largely because of the depth of fill required and the high cost of constructing a retaining wall around it. The existence of subway tunnels at the Manhattan Landing site and the effects of fill on the river currents also dictated platform construction. The cost of platforming at Manhattan Landing is approximately $40 per square foot. Site preparation at Battery Park City, which will be built on fill, will also cost $40 per square foot.

Financing Mechanisms

Aside from landfill and decking costs, the expenses involved in waterfront development are the same as for other large-scale developments.[1] The problem of providing low- and moderate-income apartments is also comparable.

The original plan for Battery Park City called for a mix of one-third low-income units, one-third middle-income units, and one-third conventionally financed units. But the scarcity of subsidy funds led the City Planning Commission to change the mix to 14 per cent low-income units, 56 per cent middle-income units, and 30 per cent conventionally financed units.

Funds for programs other than Mitchell-Lama mortgage subsidies are in short supply, and the extent to which they should be used for waterfront development, as opposed to urban renewal projects, is questionable. From the standpoint of City finances, however, public subsidy and tax abatement for waterfront development are readily justified by their tax yields. Most waterfront sites, being vacant or underutilized, have low tax yields. When completed, the $1.2 billion Manhattan Landing project would yield $27 million a year, as compared to the $500,000 yielded now by the undeveloped site. The Battery Park City development could yield $33 million in annual taxes.

Since waterfront development can only rarely hook into an existing system, the cost of providing an adequate infrastructure - sewers, water and power supply, streets and transportation - is a key determinant of the economic feasibility of a large project. The development must also contain or be accessible to schools, stores, health facilities, and recreational space.

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[1] See Large-Scale Development in New York City, New York City Planning Commission, 1973.

CRITERIA FOR WATERFRONT HOUSING DEVELOPMENT

The waterfront is a public resource, largely owned by the City. Although housing is a public need, it would be unfair to use sections of the waterfront for the exclusive benefit of private tenants. That is why waterfront housing should provide public amenities with visual and pedestrian access. In many places, industrial and manufacturing facilities, storage warehouses, highways or railroad tracks have disrupted the continuity of the original street grid and cut off the interior city from the waterfront.

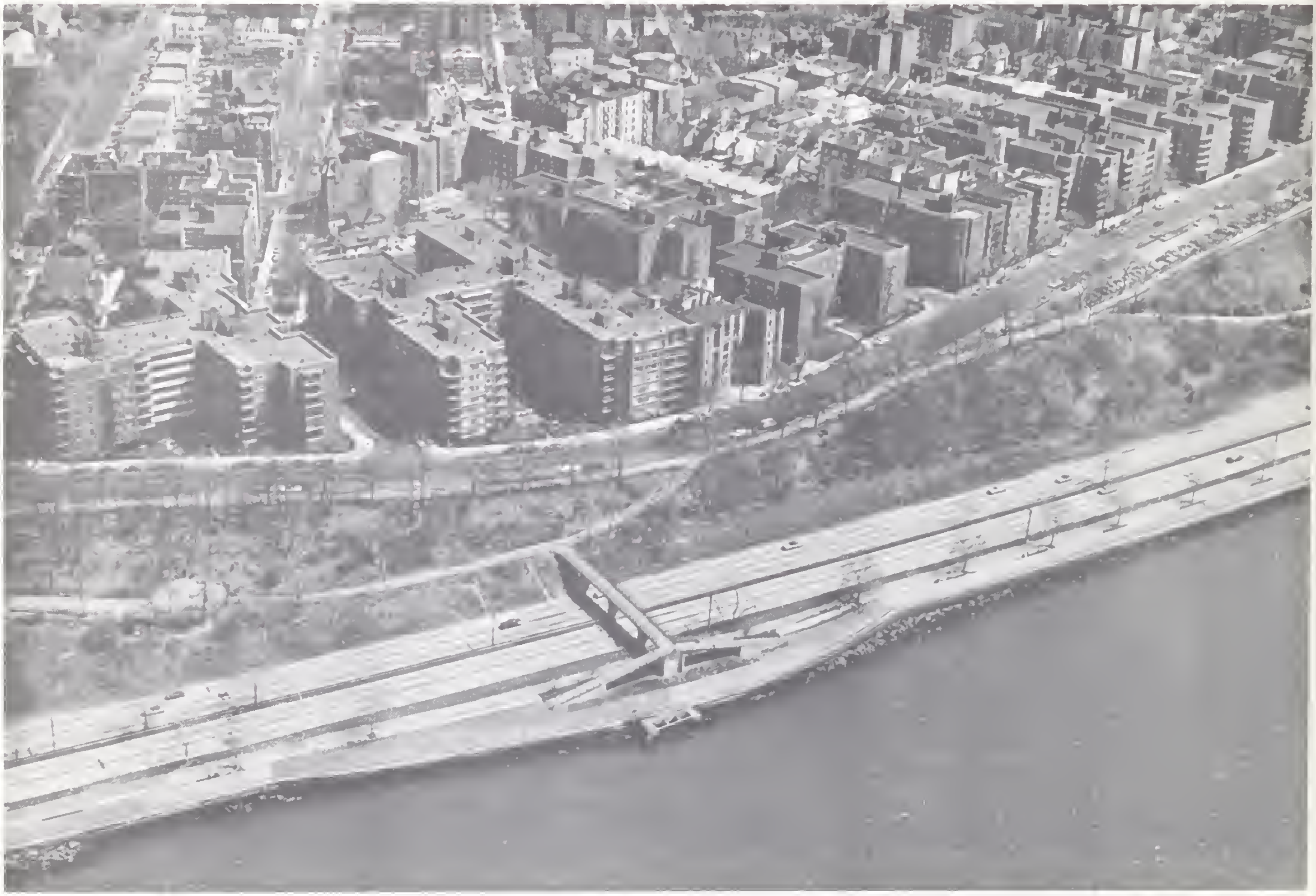
Visual corridors that extend the street grid pattern to the water can provide the necessary link between the waterfront and the interior city by making certain that specified waterfront views are not obstructed by buildings or other construction. Pedestrian approaches to the waterfront should be contained within these visual corridors. Pedestrian approaches with visual access are likely to be more attractive than those without visual access. If a project blocks a view of the water, fewer people will come to its waterfront esplanade. By the same token, good views of the water unaccompanied by easy physical access will also limit use of waterfront amenities. Narrow pedestrian overpasses, such as the ones along the East River in Manhattan, receive little use.

Although residents may prefer privacy and developers may worry about security problems, the public clearly does not benefit from waterfront enclaves. In some instances, residents suffer, too. Closed-off developments may be too small to support adequate commercial facilities and too distant from upland stores for convenience.

Transportation Access

Site accessibility is a key factor in development. Where mass transportation is convenient, vehicular access need not be encouraged. In congested areas, on-site parking can be reduced below generally required levels as a disincentive to car travel.

Many waterfront sites, however, are fairly distant from mass transit facilities. Good vehicular access is then crucial. Where waterfront highways exist, only new service roads will be needed. Elsewhere, and especially in areas of high automobile ownership, on-site parking requirements can be increased to prevent a shortage of parking spaces in nearby neighborhoods.



Cut off from the waterfront by the Shore Parkway, Brooklyn apartment-dwellers nevertheless have commanding views, a shoreside park, and a bicycle path reachable by an overpass.

Scale of Development

Waterfront developments should take into account the scale and physical characteristics of surrounding developments. Limits on the height and setback of new buildings, superimposed on existing zoning controls, can achieve a certain harmony between new and existing development.

Where vacant waterfront land is adjacent to neighborhoods in which single-family homes predominate, such sites should probably have low-density rather than high-density developments. A proposal for a low-density development of 150 semi-attached homes on Staten Island's southeast waterfront is now under consideration. In return for designation as a planned unit development, street mapping, and a special permit for a sewage treatment plant, the developer would provide the internal road system, landscaping, and public access to a waterfront esplanade. This low-density proposal exemplifies the kind of development that might be suitable in many waterfront areas of the City.

The Relationship between Waterfront Development and the Water

The design of waterfront housing should take cognizance of views, sun reflections on the water, water spray, and prevailing winds. Ideally, waterfront developments should be oriented toward the water, while at the same time providing transitions between the interior city and the shoreline. Design controls should cover setbacks, balconies and terraces, esplanades and open space requirements.

The Application of Urban Design and Zoning Controls

Large-scale waterfront developments that combine housing with public recreation are a relatively recent phenomenon. The special urban design and zoning controls that the City has formulated for three large-scale, multi-use developments - Battery Park City, Manhattan Landing, and St. George Place - are even more recent. Since these projects are still in their early stages, it is impossible to determine how well the controls will work, but they certainly represent important moves in the right direction.

Both Manhattan Landing and Battery Park City have special zoning districts governed by design controls that safeguard the public interest and yet allow sufficient flexibility to private developers. The legislation encourages mixed use within buildings, or vertical integration, to assure more open space and more efficient land use, reduces parking spaces to 50 per cent of current City requirements, and requires that pedestrian circulation be physically separated from vehicular traffic. Finally, it requires that all public spaces be open to the sky.

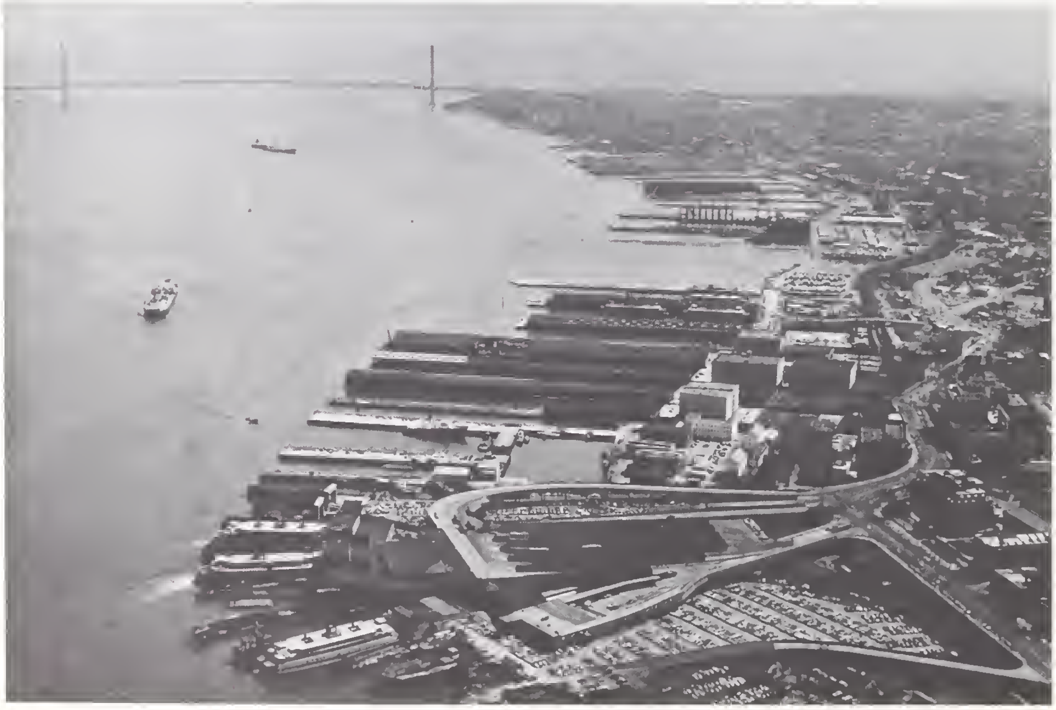
Each project must have a public waterfront esplanade: in Manhattan Landing the esplanade will be 150 feet wide; in Battery Park City, the esplanade will be narrower because the greater depth of the site permits upland parks as well.

A series of visual corridors will contain pedestrian paths to the river. The walking distance of these paths cannot exceed 150 per cent of the straight line distance. The controls also require additional pedestrian paths to permit unobstructed circulation within the projects.

Finally, the urban design controls require that new development in close proximity to historic areas, such as the South Street Seaport, or to other major developments, complement existing structures.

Similar controls for St. George Place on Staten Island will also provide visual corridors and pedestrian access to a waterfront esplanade.

Underwater areas between the pierhead and bulkhead lines can be included in the computation of required open space if 40 per cent of the total open space in the project is usable and accessible. Five per cent of this usable open space must be devoted to such recreation facilities as a continuous public pedestrian walkway along the water. These provisions allow greater bulk in the development in exchange for amenities.

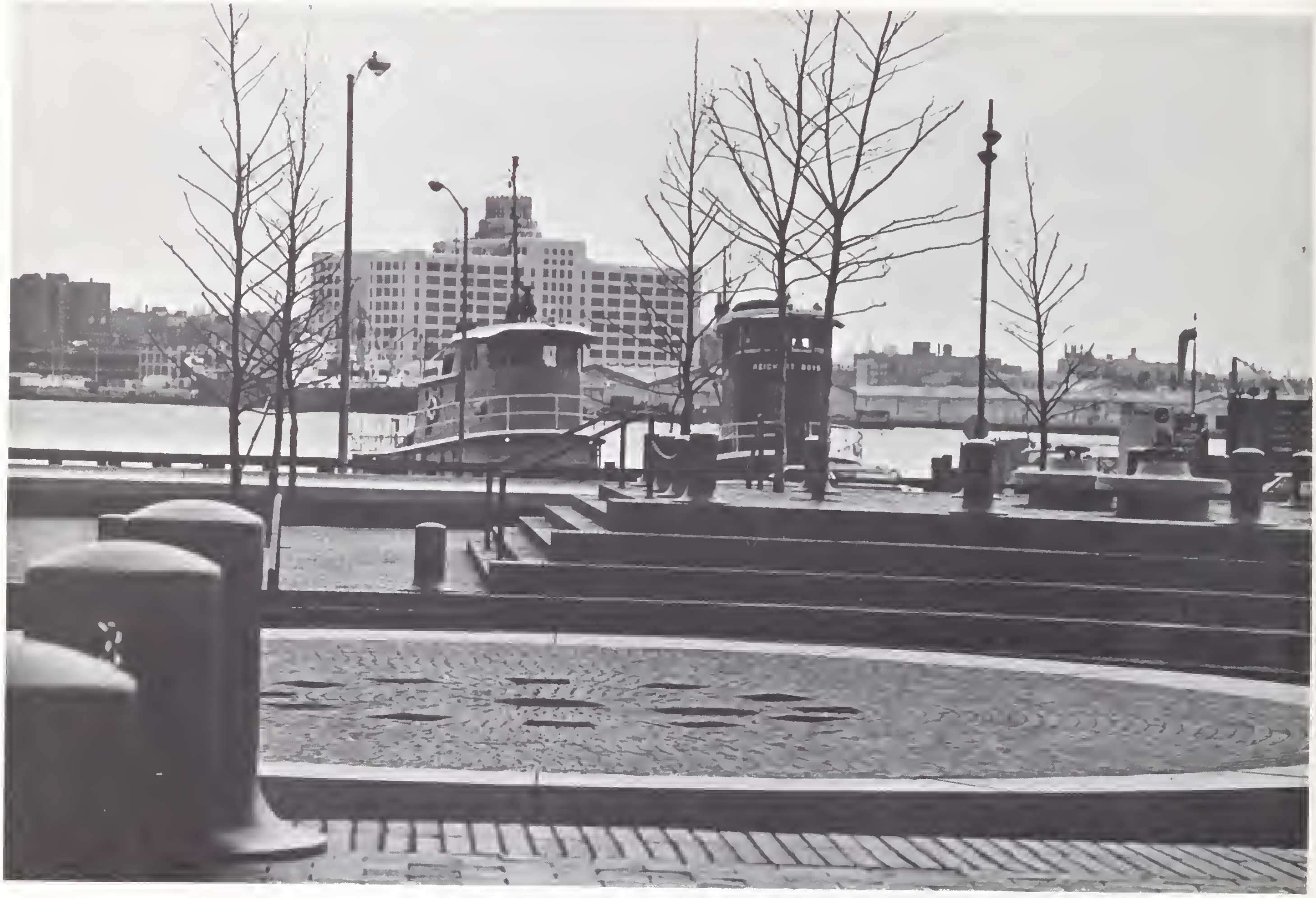


East of the Ferry Terminal, St. George Place on Staten Island (site shown) will have 2,700 apartments and public recreation facilities.

- How do waterfront parks take advantage of their proximity to the water?

- What types of waterfront parks should be built in the future?

- How should the City plan for waterfront recreation?

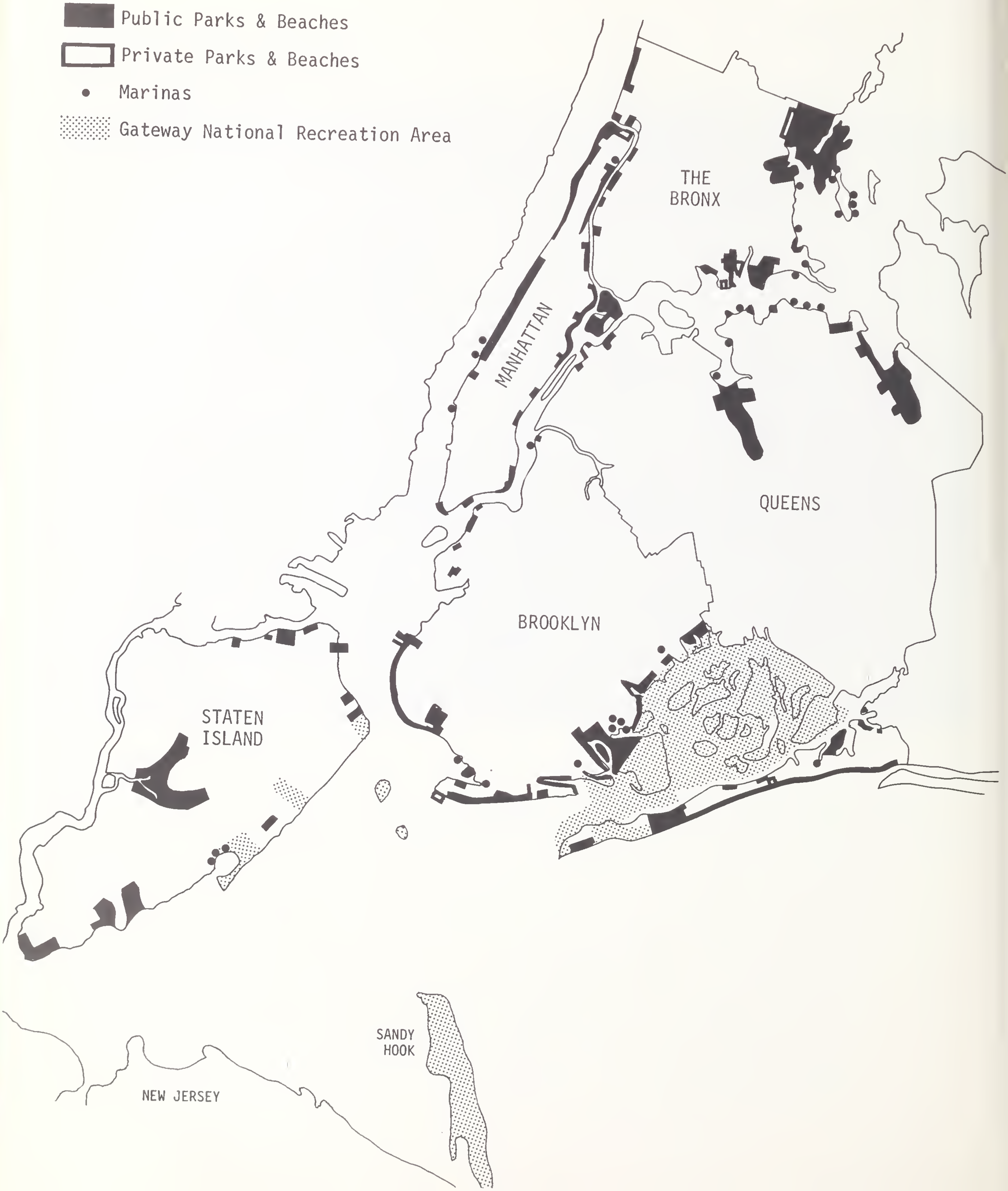


RECREATION:

The new plaza in Jeannette Park is so brilliantly designed and engineered that the shoreline -- actually a highway away -- appears immediately adjacent.

Not all vacant or underutilized land along the waterfront is suitable for recreational development, and other necessary activities will limit the availability of land for recreation purposes. But the main obstacle to full realization of the recreation potential of the waterfront is a shortage of public funds. Although some facilities, such as marinas, can be commercially developed, and others, such as promenades, may be included within housing developments and financed by private developers, most waterfront parks and beaches require public funds for their development and maintenance. Public funds are also necessary to eradicate pollution in waters that can be made suitable for swimming and fishing. The limited availability of City, State and Federal funds makes planning for waterfront recreational facilities a long-term proposition, but it in no way obviates the need for that process to begin.

New York City's diverse waterfront recreation facilities have in common only one feature: they all provide open space with water views. In all other respects, they differ. The recreation provided may be either passive or active. The available activities may require the water, such as swimming, fishing and boating, or have no relationship to the water, such as walking, bicycle riding, and team sports. Facilities include public parks, which may be strip parks that primarily serve contiguous neighborhoods; large parks that serve an entire region or borough; beaches that serve the entire City; or historic sites. And they include private commercial facilities, such as marinas, amusement parks, and sportsfishing fleets. The great variety of recreational facilities along the shore underscores the importance of the waterfront in providing an escape from the din of city life.


▆ Public Parks & Beaches
☐ Private Parks & Beaches
● Marinas
▨ Gateway National Recreation Area
THE BRONX
MANHATTAN
QUEENS
BROOKLYN
STATEN ISLAND
SANDY HOOK
NEW JERSEY

PARKS

Several strip parks - oases in otherwise dense environments - line the City's shores, including Riverside Park, running from 72nd Street to 129th Street; Fort Washington Park, running from 158th Street to Dyckman Avenue; the East River Park, running from Corlears Hook to East 12th Street; Shore Park, running from Bay Ridge to Bath Beach; and Astoria Houses Park along the East River in Queens.

All of these parks are adjacent to housing developments. And, with the exception of the Riverside Park Marina at 79th Street, their facilities for active recreation are generally incidental to their waterfront locations. Riverside Park, for example, offers playgrounds, ballfields, a running track, tennis courts and a long waterfront promenade. East River Park provides much the same facilities. Astoria Houses Park includes a waterfront promenade and a variety of playing fields and wading pools.

Many of these parks provide the only open space in their areas, together with water views that range from pleasant to spectacular. Although they account for a relatively small portion of the City's total parkland, they are of singular importance to their communities. The major drawback of many strip parks is that they are either divided by highways that limit access or they are located opposite highways with few pedestrian overpasses. The best - and most expensive - solution to the problem is to deck over the highways. Short of that, planning for strip parks will have to include provision of pedestrian easements and overpasses to the water, when required.

Local Parks

The problem of pedestrian access to local parks along the waterfront is much the same. Local parks differ from strip parks primarily in shape, not function. They are generally deeper than strip parks and have a much smaller proportion of land along the shoreline.

A few, such as Battery Park at the tip of Lower Manhattan and Von Briesen Park in Staten Island, are primarily places to sit, walk and enjoy magnificent waterfront vistas. But most local waterfront parks, such as Astoria and Crocheron in Queens, Owl's Head in Brooklyn and Harlem River State Park in the Bronx, offer a variety of facilities. Astoria Park has a large swimming pool, ballfields, playgrounds, bicycle paths and waterfront promenades. Owl's Head Park is the start of a scenic bicycle path that extends along the waterfront to Bensonhurst Park. Crocheron Park has a large number of athletic fields. Again, while these parks benefit from waterfront locations, most of their facilities do not materially differ from facilities at inland parks.

In contrast, a new ingenious design will provide a 50-acre riverfront park for West Harlem and will simultaneously disguise the enormous North River sewage treatment plant. The park, financed by the State Park Commission, will cover the plant's 30-acre roof and will extend 10 acres on each side. Riverbank will include a community center, an amphitheater, wading and swimming pools, an ice skating rink, a restaurant, shops, playing fields, a public dock and fishing pier. It is an excellent example of how, with imagination, a relatively small park can take maximum advantage of a waterfront location even though the water is not fit for swimming. Many parks are only partially developed and represent a relatively untapped resource for innovative waterfront use. These include Soundview on the south shore of the Bronx, Dreier-Offerman Park in Brooklyn, and Bayswater Park in Queens.

A 14-acre public park will be built on top of the projected Convention Center over the Hudson River.

Where local neighborhood parks do not exist, unused piers often serve as sunbathing and water-viewing spots. Although they are not recreation facilities, they serve an important recreation function. A half century ago the City had five play piers. One remains - although it is not called that - in Tompkinsville on Staten Island. This uniquely urban phenomenon, known as Cromwell Center, includes a gymnasium, basketball courts, a stage, and light activity rooms within a three and one-half acre covered pier. Declared unsafe and closed in 1967, the pier aroused such impassioned community support that it is now undergoing a three-stage rehabilitation that will cost $2.1 million. The Morton Street Pier in the West Village is another example of a pier providing recreation opportunities.

Regional Parks

The City's two largest parks front on the shoreline. Pelham Bay Park, which has more than 2,100 acres along the Hutchinson River, Eastchester Bay, and Long Island Sound, includes the only public beach in the Bronx, as well as such non-water-related facilities as two golf courses, archery and firing ranges, bridle paths and ample places for hiking and bicycling. Flushing Meadow-Corona Park, which covers more than 1,250 acres, is primarily an inland facility, with a small section on Flushing Bay that includes a boat basin.

Several smaller, but potentially important, regional waterfront parks are largely undeveloped or partially developed. Wolfe's Pond Park in Staten Island is largely woodland, with about half a mile of beach along Raritan Bay. Canarsie Park in Brooklyn, also only partially developed, has athletic fields and an unused waterfront. A proposal to lease the waterfront to a concessionaire for a marina is now being considered. Edgemere Park on the bay side of the Rockaways, which will eventually have playing fields and handball courts, is still largely marshland.

Beach Facilities

The City has 18.4 miles of public beach. Although some of the beaches are temporarily closed because of environmental hazards, most are thriving, often congested areas. Orchard Beach, on the northeastern shore of Pelham Bay Park, is one mile long and overcrowded. The only public beach easily accessible to Bronx residents, it often attracts as many as 75,000 on a mid-summer day. Ferry Point, now only partially developed, could provide a second beach for the Bronx if pollution problems could be resolved.

The Rockaways' 13 miles of ocean beach are among the most popular of City-wide recreational facilities. The waters are the cleanest in the City and among the best for swimming and surfing. Rockaway Playland, a commercial facility between Beach 97th and Beach 99th Streets, is one of the last remaining amusement parks in the City.

Coney Island's three and a half miles of beach attract some 22 million people a year, and nearly 1 million on a peak day. Unfortunately, many of its adjacent facilities are deteriorating. The boardwalk and several playgrounds, playing fields and picnic areas are in disrepair. However, new facilities, such as the Abe Stark Skating Rink, and the upgrading of older facilities, most notably the Aquarium, are hopeful signs that Coney Island will take on new life.

Manhattan Beach Park, in the Sheepshead Bay area, has swimming facilities. The Sheepshead Bay fishing fleet, however, is a unique regional resource, attracting City sportsmen in pursuit of bluefish, fluke, snapper, cod and flounder off the Atlantic coastline.

South Beach in Staten Island is a well-developed park, with two and a half miles of beach and boardwalk, picnic areas, handball courts, a one-mile jogging trail and four softball fields. But here, too, the boardwalk is in bad shape.

Gateway National Recreation Area

Gateway is the largest and most innovative recreation area in the City. Covering more than 20,000 acres, it represents the Federal government's first attempt to develop a large park in an urban area, embracing two states - New York and New Jersey. New York City transferred to the Federal government most of the land (nearly 17,000

The City has 18.4 miles of public beach including Coney Island (top). Breezy Point (bottom) will become part of the first urban national park, the Gateway National Recreation Area.

acres) including some of the City's largest parks: the Jamaica Bay Wildlife Refuge, part of Marine Park in Brooklyn, and Great Kills Park in Staten Island. Breezy Point, including Riis Park, and Hoffman and Swinburne Islands, were also part of the transfer. The only area in New Jersey that is part of the park is Sandy Hook.

Gateway will take some 20 years to develop. Jamaica Bay, the largest unit within the park, is one of the few natural marshes remaining in the entire metropolitan area, and a prime objective will be to preserve its natural state. That may be difficult because its shorefront now contains more than half of the City's boating facilities, and beaches are planned which could accommodate an estimated 13 million people annually.

Breezy Point will be the most developed portion of Gateway. A master plan prepared by the Interior Department in 1969 calls for the development of a broad array of recreational facilities. The 236-acre Jacob Riis Park will include a swimming beach, a golf course, and a huge parking facility. The boardwalk and other existing facilities will be improved. Fort Tilden, which lies just west of Riis Park, will also become a recreational facility once the land area is released by the Department of Defense.

Great Kills Park is a flat landfill of about 1,450 acres located along the southeastern coast of Staten Island. The City has retained ownership of 270 acres. Very little in the way of development is scheduled for Great Kills, and most of its four-mile shoreline will be a beach. Swimming is permissible along most of the shorefront. Hiking, fishing, bicycling, and boating will also continue to be important recreational attractions.

Hoffman and Swinburne are too very small City-owned islands that lie just south of the Verrazano-Narrows Bridge in Lower New York Bay. Hoffman Island has 11.5 acres, while Swinburne has only 2.5 acres. A study is underway to determine the feasibility of joining these islands to the mainland with landfill and creating a single 250-acre park, with promenades, outdoor cafes, and picnic areas. With ships from every seagoing nation continually passing by, this island park, located at the entrance to New York Harbor, would be endlessly fascinating.

A major obstacle to full development of a Gateway is the lack of public transportation access. The City has major access study underway, including investigation of the feasibility of waterborne transportation.

The South Street Seaport (top) offers historic ships, a museum, a restaurant, and sea breezes to Wall Streeters on their lunch hour and to tourists all week long. The venerable Statue of Liberty in Upper New York Bay (bottom) attracts more than 1 million visitors a year.

Historic Sites

A number of the City's historic sites are mixed-use waterfront recreational facilities. One of the most successful attempts to integrate the waterfront with the rest of New York is the South Street Seaport. A non-profit corporation has restored a decaying underutilized row of piers and created a living museum of various types of ships integral to New York's history. This oasis near the Wall Street office area is popular for lunchtime strolling and is also a major tourist attraction.

Surrounded by manicured gardens, the Conference House Landmark in southern Staten Island, also includes a section of beach for public use. This was the site of unsuccessful negotiations with the British to end the War of Independence. The entire park includes almost 225 acres of public land.

The Alice Austen House Landmark was the pioneer photographer's home in the early 1900's. The spectacular views of the harbor, shipping, and the Manhattan Skyline that her photographs helped make famous can still be seen from the house and park in the Rosebank section of Staten Island.

Sailor's Snug Harbor, which features a row of yellow-and-white Greek Revival Buildings, was once a community for retired sailors. The 62-acre park overlooking Kill Van Kull is largely woodland and provides excellent recreational opportunities.

Finally, no discussion of New York's waterfront recreation would be complete without mention of the Staten Island Ferry and the Statue of Liberty, which attracted more than a million visitors last year.

THE FUTURE

To accommodate the demand for more waterfront recreational facilities, innovative concepts are being translated into park proposals. One idea is to capitalize on unique waterfront vistas by using the waterways for floating parks on barges.

Such a four-acre park is planned for Lower Manhattan, to be anchored north of the Brooklyn Bridge. This facility, sponsored by the Educational Construction Fund, will include a multi-use athletic field, promenade, outdoor cafes, playground, senior citizens' area, and bridges linking the park with the shore. A floating swimming pool may also be moored to the park. Approved by the Board of Estimate, this park will cost about $5.5 million.

Across the East River, another waterfront park is planned for Fulton Ferry in Brooklyn just south of the Brooklyn Bridge. The ferry pier can accommodate a host of special facilities, such as a restaurant. With the natural water connection Fulton Ferry has to the South Seaport, boats can cross the river and expand public enjoyment of the Seaport.

Converting a defunct industrial warehouse or pier to recreational uses can alleviate the high demand for community playgrounds in some areas. Moreover the piers can then receive any number of floating facilities. Barges with swimming pools, bandshells and museums could easily circulate throughout the City.

Many groups have begun to consider these novel possibilities. The New York City Bicentennial Corporation sponsored the "Wateredges" project, which involves selecting waterfront sites for a floating theatre. The "Showboat," as it is called, will circulate throughout the City as part of the commemoration of the 200th anniversary of American Independence.

RECREATION AND THE ENVIRONMENT

Beach erosion and poor water quality limit the recreational potential of the waterfront. Beach erosion is a particular problem in Coney Island, the Staten Island South Shore and the Rockaways. Federal, State and City agencies are now jointly funding reviews of erosion control programs at these beaches.

At present, most of the beaches in the metropolitan area are fit for swimming. The best water quality in the City, as already mentioned, is off the Rockaways. A distant second is Orchard Beach in the Bronx. On Staten Island, the water quality is best along the middle portions of the Shore off Great Kills Park and Wolfe's Pond Park. A few beaches - the Sea Gate section of Coney Island and the northern part of South Beach - are not fit for swimming because sewage treatment plants cannot handle the flow after rain storms.

Fishing near the shoreline is also dependent upon water quality. In the New York harbor area, fishing is and will remain minimal because of pollution.

The goals set for the City's waterways are to render the Hudson and Harlem Rivers fit for fishing; Long Island Sound, Jamaica Bay, and the Atlantic Ocean along Coney Island fit for swimming and fishing; the Ocean, along the south shore of the Rockaways, and Lower New York Bay, from Great Kills to Fort Wadsworth, fit for shellfishing, swimming and fishing. The East River, Arthur Kill and Kill Van Kull would remain fit only for navigation.

With the completion of current clean-up programs, water quality will improve, but pollutants from New Jersey and upstate New York will continue to flow into City waters. The greatest and most important change in water quality will occur in the Jamaica Bay area, where the water from Canarsie Beach to Floyd Bennett Field will become fit for swimming. The improved water quality will also make for a better fishing area and natural habitat.

THE COSTS OF WATERFRONT RECREATION

The costs of developing waterfront recreational facilities are high, and funding is limited. Total City appropriations for improving waterfront recreational facilities in fiscal year 1974/75 came to slightly more than $5.7 million. Projects now on the books are expected to cost the City $47.7 million in the succeeding five fiscal years, which would require funding at an annual average rate of $9.5 million. In other words, the City will have to increase its annual level of funding by nearly $4 million - or two-thirds - over the 1974/75 level in order to fulfill current plans for developing waterfront recreational facilities. The annual increase is high because a large number of projects now in design will go into construction in 1975/76 and later.

Projects now on the books include a number of undeveloped and partially developed waterfront parks (see table at end of chapter). The costs of further development and improvement through 1979/80 are approximately $7.4 million for Soundview Park, $4.5 million for Pelham Bay Park, $756,000 for Canarsie Beach Park, $233,050 million for Dreier Offerman Park, and $1.6 million for Bayswater Park. Rehabilitating and improving beach facilities during the same period will cost $12.3 million for Coney Island, $7.8 million for Rockaway Beach and $2.1 million for Orchard Beach. The expenses for water pollution control are not included in these figures.

PLANNING FOR WATERFRONT RECREATION

The City's waterfront recreation has taken varied forms in its history; in the nineteenth century, people strolled through the port, watched the ships, and went to the fish market. While there were few if any public parks on the shore, the waterfront was in fact a rich and endlessly fascinating cultural resource.

Today's waterfront retains that diversity of uses but has lost much of its recreational value. The port no longer provides a feast for spectators.

Yet the City's waterfront presents extensive opportunities for recreational development. The amount of undeveloped parkland alone demonstrates this fact. And if the goal is to expand public use of the waterfront, recreational development will play a major part in that effort.

The first step must be to analyze the inventory of existing recreational facilities. Service deficiencies may be geographic (a community with little or no open space on the waterfront) or based on types of facilities (the City's beaches are overcrowded). However, recreational planning has no quantifiable requirements: deficiencies must be measured in terms of supply and demand.

Criteria

Three sets of criteria help determine how best to meet recreational needs with limited resources - public benefit, access, and use patterns.

Because "recreation" means different things to different people, public benefit is difficult to assess. To some, baseball fields are an essential; to others, a quiet place to sit is preferable. A metropolitan park with mass transit access benefits many people, but a local waterfront esplanade provides equivalent public benefit on its own scale.

Access has several meanings: vehicular, pedestrian and visual; each allows different uses of the waterfront. Vehicular accessibility affects both local and regional users. Highways can act as barriers to local access by pedestrians but facilitate regional access by automobile. Good public transit links are clearly a major factor in regional accessibility.

Pedestrian access is integrally related to visual access, providing views as well as approaches to the waterfront. Park access must be more than sufficient. It must actively attract users. A narrow pedestrian bridge over a highway will suffice for children who can find ballfields nowhere else but does little to encourage use of the waterfront as a natural part of City life. Visual corridors which extend the street grid pattern will lead the foot as well as the eye to the shore. Careful design of facilities can open new possibilities of waterfront use simply by creating awareness of the water's presence.

Use patterns encompass several factors, including temporal and functional variations. Parks may be used for lunch hours or all day long. Some facilities, such as beaches, operate only during the summer, and others are open year-round. Many people feel that activities in waterfront parks ought to be generic to the waterfront. A ballfield, for example, derives no clear benefit from proximity to the water while beaches and fishing cannot exist without it. Other uses, such as promenades, do not require water but are enhanced by its presence.

Land-use compatibility affects use patterns, often acting as a constraint. Small-scale residential neighborhoods cannot bear the burden of regional facilities. Waterfront parks in industrial zones are often undesirable because of their surroundings. In contrast, active commercial areas near the shore provide many potential park-users.

The City has available to it a great variety of land resources for park development. Some, such as the wetlands of Jamaica Bay, should be preserved for their uniqueness. Others, such as Pelham Bay and Soundview, are partially developed parklands with much untapped potential.

Other opportunities include unused piers, landfill areas, mapped but unbuilt streets and tax delinquent properties. The City can gain recreational amenities as a trade-off on waterfront development by using incentive zoning. Unique commercial and historic areas also provide special opportunities for recreation.

Planning Methodology

The planning methodology discussed here has four steps: a statement of goals for waterfront recreation; an inventory of existing facilities and analysis of needs; an evaluation of critical program elements, using planning criteria; and an inventory of resources. These steps lead to development options, or programs for action. The options will vary with different assessments of goals, needs and demands. The process is influenced by the weight given to competing interests in waterfront planning, and inevitably reflects value choices made in the public realm. Rational planning can contribute to but never control these choices.

TOTAL ESTIMATED COSTS OF CURRENTLY PLANNED IMPROVEMENTS OF WATERFRONT RECREATIONAL FACILITIES*

BRONX

Co-op City, Recreational area near Hutchinson River:	$ 3,050,000
Ferry Point Park, Master Plan:	$ 2,000,000
JFK Community Center, Diving-swimming Pool:	$ 3,100,000
Orchard Beach, Expansion of bathing facilities:	$ 2,100,000
Park Development, adjacent to P.S. 175, City Island:	$ 400,000
Pelham Bay Park, Unimproved areas, and rehabilitation of Rice Stadium:	$ 2,161,419
Pelham Bay Park, Ice Skating Rink:	$ 1,300,000
Pelham Bay Park, Ballfield Lighting:	$ 1,115,000
Riverdale Park, Development:	$ 124,874
Soundview Park, Development:	$ 7,485,800

BROOKLYN

Canarsie Beach Park, General Improvement:	$ 756,110
Coney Island, Improvement of boardwalk, comfort station, lifeguard and concession building and park development:	$12,250,581
Dreier Offerman Park, Development, including Boat Basins	$ 233,052
Kaiser Park, Seawall Rehabilitation:	$ 1,260,000
Seaside Park, Bandshell:	$ 160,000

TOTAL ESTIMATED COSTS OF CURRENTLY PLANNED IMPROVEMENTS OF WATERFRONT RECREATIONAL FACILITIES* (continued)

MANHATTAN

Col. Charles Young Playground, New locker rooms and ballfield lighting:	$1,000,000
Downing Stadium, Randall's Island, Rehabilitation and Reconstruction:	$ 650,000
East River Park, Rehabilitation and Improvement:	$1,332,130
Fort Tryon Park, Development and Rehabilitation:	$ 800,000
Highbridge Park, Rehabilitation of Stone Parapet Wall and Promenade:	$1,292,000
Highbridge Park, Rehabilitation and Improvement:	$1,264,644
Inwood Hill Park, Roller Hockey Rink:	$ 52,500
Riverside Park, General Rehabilitation:	$1,178,184
Thomas Jefferson Park Rehabilitation:	$1,299,901

QUEENS

Alley Park, Development:	$5,817,050
Bayswater Park, Development:	$1,573,681
Flushing Meadow Park, Marina:	$ 685,000
Rockaway Beach, Boardwalk Rehabilitation:	$7,819,500

TOTAL ESTIMATED COSTS OF CURRENTLY PLANNED IMPROVEMENTS OF WATERFRONT RECREATIONAL FACILITIES* (continued)

STATEN ISLAND

Alice Austen House and Park	$ 515,000
Cromwell Recreation Center, Pier 6 Rehabilitation and Improvement:	$2,080,650
Narrows Esplanade, Development:	$2,100,000

CITY-WIDE

Shore Protection, Rockaway Beach, Coney Island, and Staten Island:	$5,787,500

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*Figures taken from 1974-75 City Planning Commission Draft Capital Budget, January 2, 1974.

Total estimated costs are not allocations; they indicate the scope of planned improvements.

- Why is the Staten Island Ferry the only remaining ferry service in New York City?

- Can the City's waterways be used for a mass transportation system?

- What roles do other transportation facilities (airports, highways, bridges, tunnels, etc.) play on the City's waterfront?

- What can be done about improving access to the waterfront where highways have made it unapproachable?

TRANSPORTATION:

At a bargain nickel a ride, the Staten Island Ferry carries about 67,000 passengers on an average weekday from South Ferry to St. George and back.

Water, and access to it, has historically been considered a valuable transportation resource. Eighty per cent of the metropolitan areas in the United States are located near bodies of water - oceans, lakes, rivers, estuaries, sounds, or bays. More than 5 million New Yorkers live within two miles of the waterfront.

As large-scale developments take place on the shore line, using the City's abundant waterways for transportation will become increasingly logical and attractive.

High speed waterborne transportation has been used extensively abroad for the last 15 years. Great Britain, several Scandinavian countries, and the U.S.S.R. are considerably ahead of this country in the practical application of waterborne transportation technology. However, the "Jones Act," a Federal law prohibiting the use of foreign-built marine craft for "hire or reward" in the continental United States, effectively prohibits taking advantage of "off-the-shelf" foreign technology.

There are other problems involved in setting up a viable waterborne transportation system. The purchase and operation of high-speed vehicles is quite expensive, and obtaining insurance for marine mass transit operations is a complex matter. Few facilities exist where travelers could transfer from ships to land transit, an essential ingredient of a successful system. Finally, there are limitations in the operating performances of current vessels.

Past applications of high-speed waterborne transportation in New York have been largely experimental and limited. When commutation services were offered, the prices made such service a luxury rather than a practical alternative to existing modes.

HISTORY OF WATER TRANSIT IN NEW YORK CITY

In their way, the New York ferries have become almost as much a part of folklore as the American stagecoach or the clipper ship. Over three centuries they have provided inspiration for poets, a romantic setting for lovers, and a cool interlude for millions trapped in the steaming City. They have also been an invaluable part of the City's transportation system.

The earliest ferry, known as the "Old Ferry," was established between the foot of the present Fulton Street in Brooklyn and the foot of Peck Slip in Manhattan, the point where the shores of Long Island and New Amsterdam come closest together. Would-be passengers blew a horn which hung against a tree to summon the ferryman, Cornelius Dircksen, who left his farm work to ferry them over in his little skiff. The ferryman often had a difficult time rowing against strong currents and unfavorable winds.

The City enacted its first ordinance affecting waterborne transportation in July 1654. This ordinance, to license ferries, resulted from the "daily confusion occurring among the ferrymen on Manhattan Island, so that the inhabitants are waiting whole days before they can obtain a passage, and then not without danger and at an exhorbitant price." The ordinance also provided for adequate passenger shelters at both terminals and regulated the hours of operation and prices of the ferry line.

Before engines were steam-driven, the ultimate in service was provided by "horse-boats." Ferrymen began hitching horses to treadmills which, in turn, were connected to primitive paddlewheels. These horse-boats were eventually introduced on the Brooklyn Ferry and made 12 to 16 crossings a day, carrying up to 200 passengers across the East River in eight to 18 minutes. Although the horse-boats made trips at regular intervals, a number of ordinary rowboats were always kept on hand for those who did not care to wait until the larger boats made their trips.

Steam Ferries

With the introduction of steamboats, a new era in water-navigation began. Robert Fulton's first steamboat, the "Clermont," was used between Manhattan and New Jersey in the years 1807-1808. A similar ferry began plying between Beekman's Slip in Manhattan and the old ferry slip at Brooklyn in 1812. This service lasted 25 years.

Despite the advantage of steam-driven ferries, service remained erratic; greedy ferrymen made lengthy detours from their regular service to tow larger ships into the harbor - for a lucrative toll.

The passengers suffered in comfort, however. The walls of saloons were adorned with elaborate scrollwork and polished fixtures. Shining spittoons decorated the smoking room; ladies could admire themselves in six-foot mirrors.

The Staten Island Ferry is the best-known of New York's waterborne transit operations. As early as 1712, a charter was granted for ferry service between Manhattan and Staten Island. A disastrous accident on July 31, 1871 involving the death of 100 persons on the ferryboat, "Westfield," operated by the B & O Railroad, created public dissatisfaction with the ferry service. After Staten Island became part of New York in 1898, Islanders pressed for municipal acquisition of the ferry line and replacement of the fleet. The City took over the Ferry, effective October 25, 1905.

Manhattan - N. J. Ferries

Ferries also linked Manhattan and New Jersey, but the completion of the Holland and Lincoln Tunnels and the George Washington Bridge in the decade 1927-37 struck staggering blows to this service. By the late 1930's, the 35 ferry lines linking Manhattan and New Jersey had dwindled to five - all operated by railroad companies: the Delaware-Lackawanna-Western, the New York Central, the Pennsylvania, the Erie, and the Central-New Jersey.

Ferryboats flourished for about 60 years. In 1860, there were 26 lines in operation. In the early 1900's, movies stars such as Douglas Fairbanks, Mary Pickford and John Gilbert traveled to film sets in rural New Jersey on the 125th Street Ferry. John D. Rockefeller was so entranced by an itinerant ferryboat musician that he tipped the man fifty cents instead of his customary dime. The glorious ferryboat era ended about 30 years ago.

In the last decade, several attempts have been made to apply modern technology to waterborne transportation. Between 1963 and 1964, a hydrofoil line carried almost 50,000 persons between suburban Nassau County and Lower Manhattan. Even with the rather premium charge of $100 a month, the operation ran a continuous deficit and closed down after 20 months.

During the 1963 New York World's Fair, 16 hydrofoils transported more than 100,000 persons between Manhattan and the site of the Fair in Queens.

The New York Hydrofoil Company, under a City franchise, ran a commutation service in 1970 between the Upper East Side of Manhattan and Wall Street. The entire trip took 15 minutes on the East River, with three round trips made daily. The fare was $6.50 round trip.

For eight months each year, the Circle Line fleet takes sightseers around Manhattan.

The operation closed down after two months, marred by complaints of excessive noise and spray and the accidental sinking of its 90th Street float.

EXISTING WATERBORNE SERVICES

The Staten Island Ferry represents the last remaining regular ferry service in the City. Heavy subsidies have kept the one-way fare at five cents since 1905, although this fare covers only about 10 per cent of the current operating cost (roughly $11 million a year). According to a stipulation in the City Administrative Code[1], ferry service between Manhattan and Richmond cannot exceed five cents for the first six miles. As the trip between South Ferry and St. George is only 5.8 miles, the City has been forced to subsidize the Ferry's operation, thus maintaining the world's greatest five-cent ride. Nonetheless, there is mounting pressure to increase the fare to a higher proportion of actual cost.

The fleet consists of eight vessels, which carried approximately 67,000 passengers on an average weekday in 1971; weekend and holiday ridership averaged 32,000. In 1972, the system carried roughly 22 million riders and 630,000 vehicles on its 25-minute runs. More than 85 per cent of the riders use the ferry to get to and from work. More than half the passengers walk from the ferry to their Manhattan destinations. The ferry thus remains a distinctly Lower Manhattan service: two-thirds of the passengers work south of Chambers Street.

In view of the projected doubling of Staten Island's population by 1985, three new "superferries" are being bought. The City is to pay 20 per cent of the $39 million cost; the remainder will come from the Federal government. In addition, plans are being considered for the modernization of the St. George and South Ferry terminals.

Circle Line

The Circle Line is another institution. It runs sightseeing boats around Manhattan and charters its vessels for all-day and moonlight cruises. The same company operates the Statue of Liberty Ferry and the Hudson River Day Line.

From Pier 83 at the foot of West 43rd Street, three-hour sightseeing cruises around Manhattan are operated from March 15 to November 15. There are nine vessels in the fleet, each with a capacity of 500 - 600 passengers and a yearly volume of approximately one million passengers.

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[1] Section 7 4E-4.0.

The Statue of Liberty Ferry leaves from Battery Park every hour on the hour between 9 a.m. and 4 p.m. all year round. Additional sailings are made on weekends from April through October and daily between July 1 and September 15. The two vessels used have a capacity of 1,040 and 840 passengers and carry approximately 1.2 million people yearly under a 20-year contract with the National Park Service.

The Day Line service, which departs from Pier 81 at the foot of West 41st Street, travels to Bear Mountain, the U.S. Military Academy at West Point, and Poughkeepsie between May 15 and October 1. The new vessel used for this cruise is the "Dayliner," built in 1972, which can carry 3,500 passengers. The average yearly volume is 200,000 passengers.

Rockaway Boat Line

Another seasonal service operating during 10 summer weeks is the Rockaway Boat Line. The three boats have a capacity of 675 passengers. The services provided are trips from Sheepshead Bay to Breezy Point and Rockaway Point and sightseeing tours around Jamaica Bay. The average Saturday and Sunday total volumes are 48,000 passengers.

Fulton Street Ferry

The South Street Seaport Museum is considering the revival of a Fulton Street Ferry service between Brooklyn and Manhattan. A round-trip could be completed in 18 minutes, employing a 300-passenger vessel. This service could be used for commuting as well as recreation and sightseeing.

WATERBORNE TECHNOLOGY

The conventional ferry is the first vessel that comes in mind in connection with New York's waterborne transportation. Although this mode provides acceptable service on shorter runs, such as the 5.8 miles between Staten Island and Manhattan, it is too slow for long trips. The most advanced conventional ferries, "superferries," are planned for use in the Staten Island-Manhattan service. By using space efficiently and not carrying private cars, these vessels can carry 6,000 people in ferries with the same outer dimensions as those now in use.

Hydrofoils

These vehicles differ from hovercraft in their use of submerged, winglike foils. Similar to aircraft wings, these foils develop "lift" from the forward motion of the craft, eventually raising the hull completely above the surface of the water.

Hydrofoils have certain advantages over conventional craft: hull friction is reduced dramatically and the vessel can reach speeds approaching 60 knots. They are also highly maneuverable and can brake rapidly at high speeds. Unlike hovercraft, hydrofoils do not throw up heavy spray.

The primary disadvantage of the hydrofoil, particularly in New York, is its inability to travel over ice or driftwood. While ice is only a seasonal problem, debris from old docks and harbor activities is perennial.

Hovercraft

The air cushion vehicle, or hovercraft, which dates from 1956, operates on aerodynamic principles. Large fans in the lower section force air downward, where a flexible skirt contains and compresses the air, allowing the vehicle to "float" over the water's surface. A separate power source, usually a gas turbine, provides motive power by driving an aircraft-type propeller. An air rudder steers the vehicle.

Most hovercraft (except the fixed sidewall type) operate free from the ground, are amphibious, and can cope with ice, sand, mud, and bumps. Speeds reach 50 - 60 knots. Although hovercraft cannot be operated in heavy seas, choppy water and small waves offer no serious problems.

Unfortunately, hovercraft are noisy and throw up spray or dust. Usually powered by jet engines, the vessels produce noise similar to that near an airport.

Several services across the English Channel operate hovercraft, carrying as many as 250 passengers and 30 cars. To date, 95 per cent of all scheduled runs have been completed; cancellations were due to weather and sea conditions.

Rigid side-wall hovercraft are hybrids differing from ordinary hovercraft in their use of a rigid set of sidewalls to provide an air-seal and directional stability. Operating only on water, they are relatively cheap and quiet. They cope with debris, and do not require deep water for operation or docking. These craft are regularly used in Portugal, Brazil, and Greece, operating at speeds of approximately 30 knots. An American manufacturer is currently beginning production of a 65-passenger rigid sidewall hovercraft capable of speeds of 40 miles per hour.

Prospects and Issues for Waterborne Transportation

The increasing use of the waterfront, coupled with the need for additional mass transit facilities, sets the stage for using more waterborne transportation. The foremost drawback is cost.

With high-speed vessels, the longer the trip, the cheaper it is per seat mile. Boats also have a high initial cost. To achieve economic feasibility, weekday commuter runs might be supplemented with special evening services and weekend recreational travel. Trips within the City would tend to have higher operating costs. To be competitive with other forms of mass transportation, public subsidies would almost certainly be necessary for this type of service.

Although a waterborne mass transit system is not yet in sight, it is prudent to establish preliminary criteria for future systems[2]:

- Safety: Including all loading and unloading, navigation in bad weather, etc.
- Regularity of Service: Service must be year-round, all-weather, and unaffected by ice, fog, and debris.
- Transit Time: The system must be fast enough to compete with other modes.
- Convenience: This includes the location of terminals in relation to system-users, ease of transfers to bus, subway, and taxi.
- Comfort: Vessels and terminals should be heated and air-conditioned.
- Environmental Impact: System should be quiet, non-polluting.
- Multiple Purpose: A variety of trip types should be served.
- Capacity: The system should have a fairly large capacity (although each individual craft need not), if it is to have any substantial impact.

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[2] The criteria apply primarily to mass transit service rather than to premium service.

If possible, large-scale new developments such as Battery Park City, Manhattan Landing, Roosevelt Island, and the Convention Center should be planned so as not to foreclose future landing sites for a marine transit system. Other likely terminal points which would allow transfer to existing modes should also be safeguarded.

Potential markets for high-speed waterborne services probably exist between Co-Op City and Manhattan (which could also service Northeast Queens), between Wall Street and La Guardia Airport, between Manhattan and community points in New Jersey, and from various points to the Gateway National Recreation Area.

AIRPORTS

J. F. Kennedy International and LaGuardia airports are both located on the Queens shorefront. They provide the physical plant for the air transport industry's position as the fifth largest industry in the City in terms of total direct employment.

As centers for business, tourism and vacation travel, Kennedy and La Guardia are integral and important parts of the local economy. They are a mixed blessing, nevertheless, precluding alternative waterfront development along vast stretches of shoreline and creating noise pollution in adjacent residential areas.

Shortly before its opening in 1948, the land area of JFK was leased to the Port Authority by the City of New York. The total area consists of 4,900 acres and over seven miles of water frontage on Jamaica Bay. In 1973, 21.4 million passengers either arrived or departed on 346,000 commercial flights. The airport also handled over 1 million tons of cargo. Kennedy functions as the primary international gateway to the U.S. on the East Coast as well as the regional center for long- and medium-haul domestic flights.

LaGuardia shares with Newark Airport the regional market for medium-haul domestic flights and short-haul "shuttle" flights to Boston and Washington. Opened in 1939 as New York's first commercial airport, it was built by the City and the Federal Government and leased to the Port Authority in 1947. With 575 acres of land, LaGuardia occupies over four miles of shoreline on the Upper East River, Bowery Bay and Flushing Bay. Recent expansion has extended runways on pile-supported platforms over water.

There were 320,000 commercial airline operations in 1973 with a total for the year of 14 million arriving or departing passengers.

Airport Environmental Problems

The most apparent problem created by major airports comes from aircraft noise. The Noise Exposure Forecast, a scale developed specifically to measure aircraft noise levels, sets NEF40 as unacceptable for residential development. Near JFK, noise pollution and vibration is a serious irritant and affects more than a half-million residents of 55 square miles of Brooklyn and Queens. Despite the development of quieter jet engines and the retrofitting of some older engines with noise muffling systems, this will remain a troublesome problem.

Two other types of air pollution are particularly related to airport facilities:

- Jet engine emissions of particulate matter and smoke soils laundry, household furnishings and automobiles, and leaves an unpleasant kerosene odor. Their effect on health is not known.

- Vehicular emissions of airport-generated ground traffic are considered to be a greater health hazard than aircraft emissions, due to their slower dissipation rate. The relationship between congestion, pollution and health is well documented. Since almost all access to and from Kennedy and La Guardia is by automobile and taxi (until a planned JFK rail link is completed), traffic congestion will remain a fact of life.

Current and Future Air Traffic

Because of their importance to the economy, as well as their environmental impact, the City's airports have been the subject of numerous studies by both governmental agencies and business corporations. Basing their conclusions on high yearly increases in operations (an operation is one take-off or one landing) over the last two decades, the experts arrived at a virtual consensus that demand would continue to increase rapidly. It was anticipated that the number of passengers at Kennedy and La Guardia would double between 1970 and 1980, while operations would increase at a slower rate (25 per cent for Kennedy and 5 per cent at LaGuardia) as a result of a shift to high capacity aircraft. Air cargo was also expected to experience rapid growth.

Air congestion and these estimates led to a search 10 years ago for a fourth jetport and to studies of the potential expansion of Kennedy.

In late 1973, fuel shortages forced rigid allocations and sharply higher prices for jet fuel. This led in turn to the elimination of marginal or unprofitable routes and fewer flights to many cities. Operations at La Guardia declined 27 per cent in January 1974, compared with January 1973, and 16 per cent at Kennedy. While one month is not representative, the nature of the change is considered significant. Previous forecasts have been cast in doubt by the unlikelihood that duplicating flights will be restored and by the uncertain long-term fuel situation.

Alternative Airport Sites on Land

Both Calverton, Long Island and Maguire Air Force Base, New Jersey were considered in the early stages of the search for a fourth jetport for the region, along with numerous other sites. Preliminary studies indicated that neither warranted serious consideration.

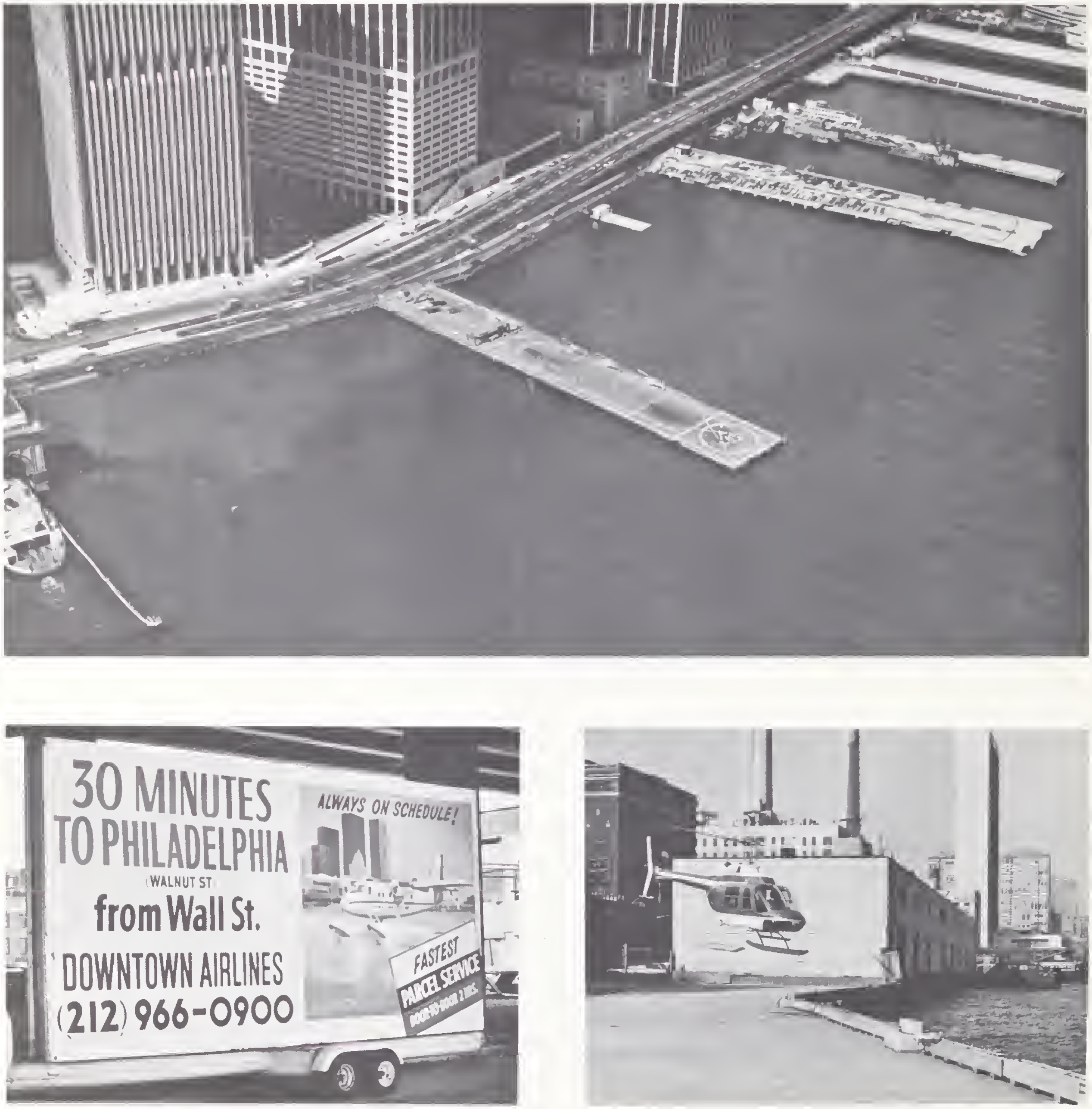
The Metropolitan Transportation Authority has proposed the development of Stewart Air Force Base near Newburgh, New York. Although vacant land is available for runway and terminal expansion, Stewart has been opposed by environmental groups, and, even with a planned high-speed rail link, would have an hour's travel time to Manhattan. The MTA has not yet accepted a consultant's proposal to fully develop Stewart, and in the light of the general uncertainty in the air transportation industry, the purchase of Stewart is being represented as an effort to "landbank" an airport site in the event that a fourth major airport is eventually needed.

The Offshore Multiport

The Federal Aviation Administration, after extensive internal study of the prospects for existing New York airports, commissioned a study in 1971 to determine the feasibility of constructing an offshore multiport to serve the New York area. The consultant reported that such a project was potentially feasible from environmental, financial, and technological points of view. The study concluded that success hinged upon building an airport of sufficient size to accommodate all of the air traffic forecast for Kennedy beyond the year 2000. Kennedy would then be phased out and used for housing, industrial development, and recreation. The multiport would combine an airport with other facilities which do not make good neighbors on land, including a deep water port for oil tankers, a nuclear generating plant and solid waste and sewage treatment plants.

The consultants said there would be no detrimental effects from aircraft noise or atmospheric pollution, while marine ecology would be disrupted only during the construction period.

Although the total cost of the project was estimated at $5 - 7 billion, it was considered feasible by means of an intricate financing scheme.



Four heliports are located on the Manhattan waterfront, including the Downtown Heliport on Pier 6 in the East River (top) and the East 34th Street Heliport (bottom right). The seaplane base at Wall Street - one of the three in the City - offers regular flights to Philadelphia (bottom left).

However, this depended on the high passenger forecast, which is now in doubt.

Further work on the offshore multiport project awaits funding opportunities for an extensive environmental impact study.

Seaplane Bases

There are three seaplane bases on the New York waterfront: Wall Street, East 23rd Street and Evers in the Bronx. They account for almost a negligible amount of space - a float for boarding, a passenger waiting room, and limited parking.

At Wall Street there is regularly scheduled week-day service to Philadelphia, on a 19-passenger Twin Otter. Itinerant aircraft, both private and charter, also stop at Wall Street on week days. Since the downtown waterfront is presently non-residential, there have been very few complaints about noise from operations at Wall Street.

Between April and November, three air taxi companies based elsewhere operate four-to-six passenger seaplanes on a charter basis from the Department of Marine and Aviation pier at the foot of East 23rd Street to beach communities on Long Island and Fire Island. During the peak summer season, approximately 40 operations take place on a Friday afternoon.

There have been complaints from residents of Stuyvesant Town and Peter Cooper Village concerning the noise of aircraft departing from 23rd Street, since many apartments in this district are not air-conditioned and windows are left open.

The Department of Marine and Aviation proposed in 1973 that the base be relocated to the foot of East 34th Street which is a mixed use area where most buildings are fully air-conditioned. Take-off runs would be conducted farther away from land to ensure lower noise levels. In addition to small seaplanes, the Department of Marine and Aviation has explored the possibility of additional commuter service to Philadelphia from 34th Street using Twin Otters. The special permit for a seaplane base at 34th Street is now under consideration. A decision on the application is a complicated process, because the proposed facility would have to be coordinated with an application for a Presidential Heliport nearby and the existing 34th Street Heliport. The local community board is opposed to further waterfront air facilities until a comprehensive waterfront plan is developed.

Located in a boatyard in the northeast Bronx, Evers is the least active of New York's seaplane bases and serves as the parking and maintenance area for one of the charter operators.

Heliports

With the exception of one private heliport in College Point, Queens, and emergency landing zones for police and medical service dispersed throughout the City, all commercial heliports are located on the Manhattan waterfront. Air safety, to a greater extent than noise, has been the main concern in regard to helicopters. The FAA considers the use of Manhattan heliports to be reaching a saturation level given high demand and a limited number of existing sites.

As the most active in the City, the East 60th Street Pan Am Metroport just east of FDR Drive accounts for 60 daily flights. After the termination of helicopter flights from the roof of the Pan Am Building due to financial problems and community opposition, the East 60th Street site was selected as an alternate location.

Opened in 1973, the East 34th Street Heliport is situated in an area of deteriorated waterfront storage sheds and open spaces used for transshipment of bulk commodities. The fenced-in heliport took approximately 300 feet of an unimproved half-mile strip of frontage used on weekends for sunbathing and river-watching. The facility, leased and operated by a charter company based on Long Island, is used for about 30 daily commuter and sightseeing flights.

The Department of Marine and Aviation has requested a feasibility study for a Presidential Heliport adjacent to this site, from which large helicopters could be operated under high security conditions. The heliport would also be available to other large passenger helicopters and provide connections to the proposed seaplane base as well as a marine mass transit terminal envisioned for the future.

The Port Authority began operation of the Downtown Heliport in 1960. Occupying Pier 6 on the East River, the heliport has a terminal building, communication facilities and a parking area. Of the 50 average daily movements, 30 are corporate and private operations and 20 are stops by New York Airways serving major New York airports.

The West 30th Street Heliport, opened in 1956, was the first commercial heliport in the City. It is operated by the Port Authority with a charter helicopter company as a tenant. There are currently an average of 65 daily operations, including corporate, government, and sightseeing flights. The heliport is located on a 400 by 70 foot strip on the Hudson River shoreline, with landing pads on piles extending out over water. Part of the land area, where eight helicopters can be parked, contains a terminal building and fuel storage tanks.

As a temporary installation, the World Trade Center Heliport is private and occupies a State-owned pier which eventually will be demolished as

Battery Park City is developed. It is used by Port Authority Helicopters, with movements numbering about 20 per day. The Port Authority is uncertain whether or not a replacement site will be sought.

The City Planning Commission recently turned down a Consolidated Edison application for special permits to operate eight heliports at their generating plants. A comprehensive heliport study is presently being proposed by the Department of City Planning, which would analyze the demand and capacity of existing heliports, and develop guidelines for the evaluation of new heliport proposals. These guidelines would include noise, land use, safety, and community concerns.

HIGHWAYS, BRIDGES, AND TUNNELS

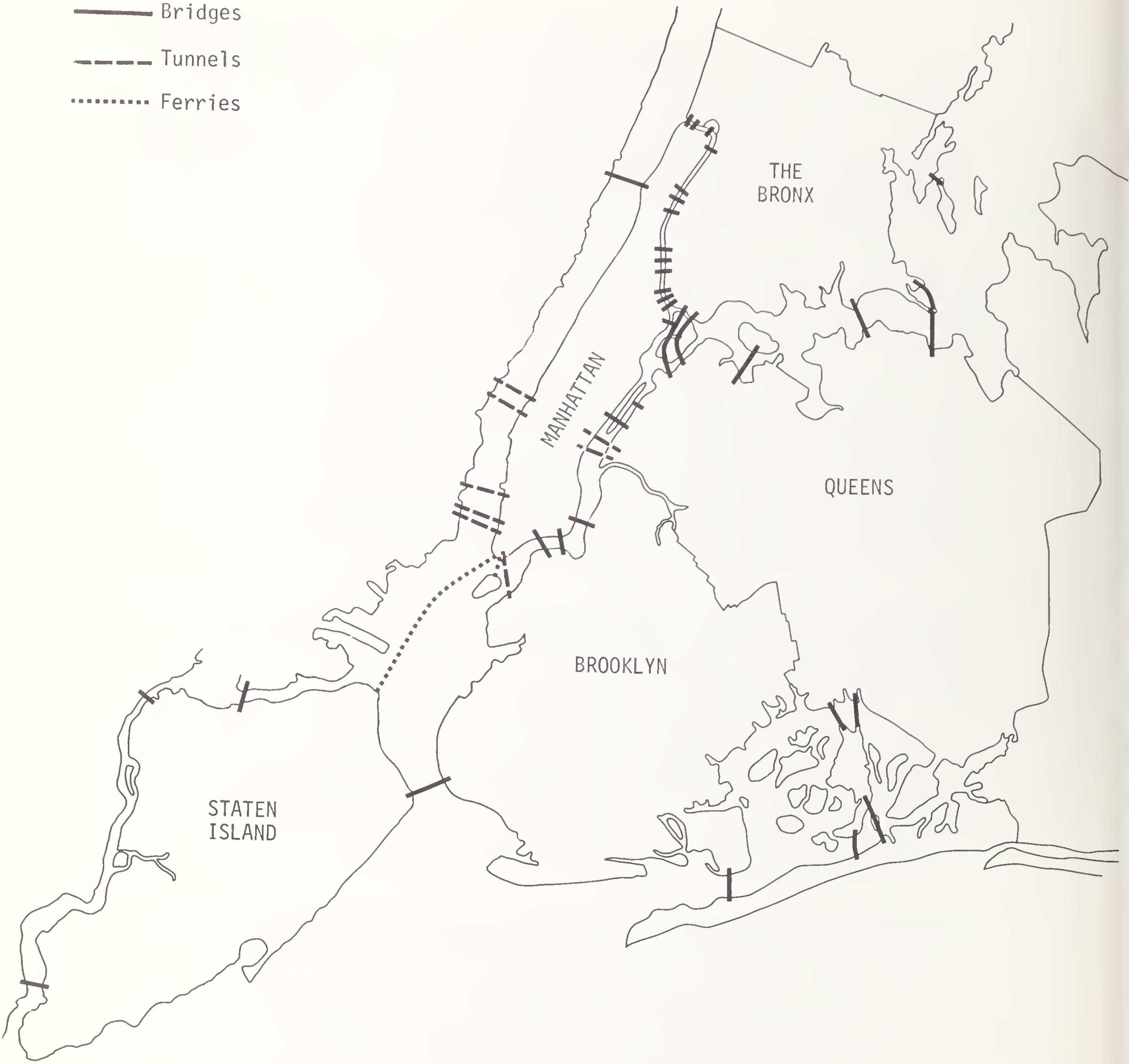
The waterfront is criss-crossed by bridges and tunnels. Although tunnels often have ugly, space-consuming approaches, they are otherwise unobtrusive. Bridges, on the other hand, can provide exciting vistas and accentuate the concept of a harbor. Both, however, have a major impact on the flow of traffic throughout the City and region. The amount of traffic flowing into the Central Business District of the island of Manhattan can be regulated by changes in bridge and tunnel configurations and in tolls.

New York City has more than 60 miles of highways along the waterfront. This was not accidental but resulted from a combination of factors - the availability of underutilized or vacant land and the desire to create scenic roads and parkways.

When highways block physical access to the shore, visual and psychological access can sometimes still be maintained. Waterfront highways can be designed to be unobtrusive. The best examples are the Brooklyn Heights promenade, built over the Brooklyn-Queens Expressway, and Carl Schurz Park above the FDR Drive. The elevated plaza at 55 Water Street appears to be directly on the shore, but in actuality it is separated from the water by a street and major highway.

Elevated highways, although often unsightly, permit waterfront access underneath, as with the South Street Seaport and Morton Street pier. Public activities help make the waterfront worth reaching.

Because waterfront highways are permanent, spot improvements in waterfront access and visual aesthetics will have to be relied upon. The one notable exception is the West Side Highway. With the active involvement in the planning process of communities along the right-of-way, public access to the waterfront is a critical design consideration.


Bridges
Tunnels
Ferries
THE BRONX
MANHATTAN
QUEENS
BROOKLYN
STATEN ISLAND

The Triboro Bridge is part of a network of bridges and tunnels linking the four islands of New York City with the mainland.

West Side Highway

Public hearings will be held on five alignment alternatives, including two "interstate" and three non-interstate solutions. The interstate options could be funded with 90 per cent Federal funds and would include a transit-way. One option is "outboard" or near the pierhead line and the other is "inboard" or closer to the existing highway right-of-way. The three other schemes would have no Federal funding: "arterial" (a Queens Boulevard-type street), "reconstruction" (rebuilding of present highway), or "maintenance" (made more difficult by recent collapses).

Whichever option is ultimately decided upon, it is clear that the West Side Highway Project could be the vehicle for providing public waterfront opportunities for this major portion of the City's shoreline.

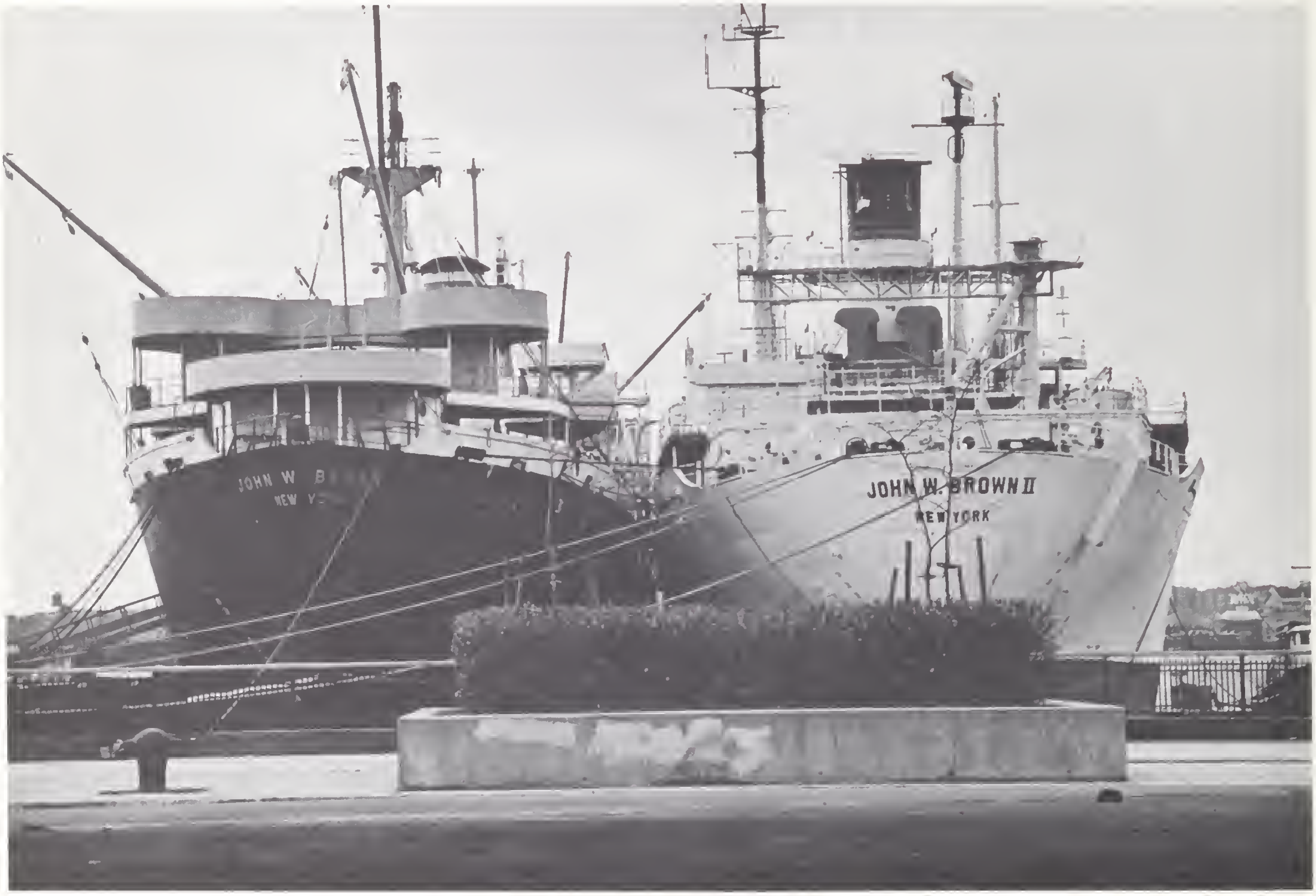
Special notice must be taken of the aerial tramway being constructed across the East River between Roosevelt Island and East 60th Street and Second Avenue in Manhattan. The 59th Street Queensborough Bridge crosses the island, but access from the island to the bridge is limited to an old elevator building which is scheduled to be torn down. Many alternatives for providing access to the island were considered, and the tramway was accepted as the best solution. This two-car system will probably be the first truly urban use of a tramway for day-to-day public transportation.

institutions

● What institutional uses occupy waterfront locations?

● What is the future of the numerous Federal properties on the City's waterfront?

● How should institutions be balanced with other waterfront uses?



INSTITUTIONS:

Two school ships docked in Manhattan's East River are part of the Board of Education's High School Maritime Program.

New York City's waterfront has a wide variety of institutions - medical, correctional and educational facilities, museums, regulatory agencies, the Fire and Police Departments, Federal properties, and the U.S. Coast Guard. These institutions' use of the waterfront varies in importance and desirability.

Some institutions require a waterfront location (the Coast Guard); others use vast quantities of water (Fire Department boats); some are attracted by the shore's amenities (nursing homes); and still others have no functional relationship to the waterfront (hospitals).

MEDICAL FACILITIES

Most institutions on or near the waterfront are health facilities - hospitals, nursing homes, and ambulatory care and health-related facilities. These facilities provide vital services and, in addition, have great economic importance. It is estimated that each hospital bed generated 3.5 jobs. The location and expansion of these institutions raise many difficult issues. The Planning Commission has instituted a new special permit process to deal with the rapid growth experienced in recent years.

Hospitals usually get located on the waterfront because development is less intense there than inland. But hospital patients can seldom take advantage of such siting because their stays are too short. A waterfront location can have disadvantages: mass transit links may be poor, and inaccessibility means that a hospital can offer fewer ambulatory and preventive care services to the local community. The increased role of the emergency room in today's hospital accentuates this drawback. Some waterfront locations are just as short of expansion space as inland ones.

Hospitals Located on or Near the Waterfront

Manhattan

Bellevue
Doctors' Hospital
Gouveneur Hospital and Ambulatory Care Unit
Hospital for Special Surgery
Memorial Hospital - Sloan-Kettering Cancer Center
New York City Department of Health Center
New York Hospital
New York University Medical Center
Veterans' Hospital
Bird S. Coler Memorial Hospital and Home (Roosevelt Island)
Goldwater Hospital (Roosevelt Island)

Brooklyn

Metropolitan Jewish Geriatric Center, Coney Island Division

Staten Island

United States Public Health Service Hospital

Long-term health care facilities do benefit from waterfront locations. The visual and physical amenities of the shore are an asset for their residents. Many domiciliary care and health-related facilities have located in popular beach areas, such as Coney Island and the Rockaways, as well as in less developed sections of the shoreline.

Residents of these facilities use the waterfront in off-peak periods (September to June), increasing its recreational benefit without crowding other users. Nevertheless, health care facilities should be compatible with their surroundings. Small-scale residential neighborhoods, for example, may not welcome large institutional buildings which generate traffic and have excessive visual impact.

LONG TERM HEALTH FACILITIES ON OR NEAR THE WATERFRONT

CPD	Vol. or Prop.	Name	Type	Stage	Number of Beds
Bronx					
10	P	Country Club Nursing Home	NH	Oper.	35
10	V	Providence Rest Home	NH	Prop.	200
14	V	Hebrew Home for the Aged	NH, HRF	Oper.	581
14	V	Frances Schervier Home & Hospital for the Aged	NH, HRF	Oper.	364
14	P	Center for Chronic Sick	NH	Prop.	350
14	P	Palisades Nursing Home	NH, HRF	Prop.	348
Brooklyn					
6	V	Long Island College Hospital	NH	Const.	406

LONG TERM HEALTH FACILITIES ON OR NEAR THE WATERFRONT (Cont'd)

CPD	Vol. or Prop.	Name	Type	Stage	Number of Beds
Brooklyn					
11	V	Sephardic Home for the Aged	NH, HRF	Oper.	176
11	V	Haym Salomon Home for the Aged	NH, HRF	Oper. Prop.	246 310
13	P	Surf	HRF	Prop.	200
13	P	Sea Bay Manor Home for Adults	DCF	Const.	176
15	P	Palm Beach Home for Adults	DCF	Const.	420
15	P	Harbor View Home for Adults	DCF	Oper.	162
15	P	Sea Bridge Home for Adults	DCF	Prop.	546
17	P	Seaview	NH	Prop.	120
Manhattan					
1	V	Beekman Downtown	NH	Prop.	200
2	P	Village	NH	Oper.	328
3	V	St. Roses Home	NH	Oper.	94
3	M	Gouveneur	NH	Const.	85
4	V	Mt. Carmel	NH, HRF	Oper. Prop.	93 400
7	P	Lynwood	NH	Oper.	67
7	P	Mayflower	NH	Oper.	260
7	P	Park Crescent	NH	Oper.	520

LONG TERM HEALTH FACILITIES ON OR NEAR THE WATERFRONT (Cont'd)

CPD	Vol. or Prop.	Name	Type	Stage	Number of Beds
Manhattan (cont'd)					
7	P	Windemere Home for Adults	DCF	Oper.	520
8	V	Mary Manning Walsh Home	NH, HRF	Oper.	347
11	M	Metropolitan Hospital	HN	Const.	50
12	V	Isabella Geriatric Center	NH, HRF Mixed	Oper. Const.	523 597
12	P	La Bonne Vie Home for Adults	DCF	Const.	220
Queens					
1	P	Ahava	HRF	Prop.	168
7	P	Cliffside	NH	Oper.	220
7	P	Woodcrest	NH	Oper.	200
7	P	College	NH	Oper.	200
11	V	St. Mary's Hospital for Children	NH	Oper.	78
14	P	Kleins Ocean View Manor Home for Adults	DCF	Prop.	160
14	P	The Brookside Home for Adults	DCF	Prop.	100
14	P	Shoreline	HRF	Prop.	480
14	P	Ocean Promenade	HRF	Prop.	150
14	P	Promenade	NH	Oper.	240
14	P	Park	NH	Oper.	280
14	P	Neponsit Home for Aged	NH, HRF	Oper.	258

LONG TERM HEALTH FACILITIES ON OR NEAR THE WATERFRONT (Cont'd)

CPD	Vol. or Prop.	Name	Type	Stage	Number of Beds
Queens (cont'd)					
14	P	Surf Home for Adults	DCF	Const.	288
14	P	Glorias Manor Home for Adults	DCF	Const.	169
14	P	Water's Edge Manor Home for Adults	DCF	Prop.	264
14	P	Ocean Crest Manor Home	DCF	Prop.	250
14	P	Rockaway Manor Home	DCF	Oper.	120
Staten Island					
2	V	Sailors Snug Harbor	NH, HRF	Oper.	284
3	P	Klein's Broad View Manor Home for Adults	DCF	Const.	200
3	P	Bayberry Manor Home	DCF	Prop.	284
4	P	Driftwood Manor Home for Adults	DCF	Prop.	48

Key

NH - Nursing Home
DCF - Domiciliary Care Facility
HRF - Health-Related Facility

Oper. - Operating
Const. - In Construction
Prop. - Proposed

COURTS

The only New York City courts near the waterfront are the Family and the Supreme Court buildings on Staten Island. The former was built in 1927 and the latter in 1919. The buildings are on Richmond Terrace, overlooking Upper New York Bay and the ferry slips. Because courts must be close to transportation and administrative centers, there is little reason to encourage waterfront locations.

CORRECTIONAL FACILITIES

Like courts, correctional facilities require good accessibility - to transport detainees to court and to facilitate visiting. Putting a prison on an island increases security, but, on balance, an inaccessible waterfront location seems undesirable. Rikers Island is the only City correctional facility on the waterfront.

EDUCATIONAL INSTITUTIONS

The City has nine existing or planned educational programs using waterfront resources or locations. They are sponsored by the Boards of Education and Higher Education and the State University.

The Board of Education operates the High School Maritime Program. Started in 1946 for training in seamanship, marine engineering, and stewardship, the program led to careers in cargo and passenger shipping. Emphasis in the last decade has shifted to electronics, marine biology, and navigation, aiming toward the Merchant Marine and Coast Guard.

The Maritime Program includes three high schools,(Beach Channel H.S. in Jamaica Bay, Martin Luther King H.S. on Manhattan West Side and John Dewey H.S. in Brooklyn) and two school ships, both docked in Manhattan. Courses include oceanography, meteorology, and nautical astronomy, as well as traditional maritime skills.

The Board of Education has proposed using Gateway National Park as an educational resource and laboratory for the study of ecology and related sciences. Training programs will also be given in park maintenance, horticulture, and recreational planning.

Board of Higher Education

The Board of Higher Education operates the Institute of Oceanography at City College in Manhattan. It serves as a coordinating and research body for the Departments of Biology and Urban Planetary Sciences at City College and the Science Departments at Lehman, Queens, Hunter, and Brooklyn Colleges. Courses are offered in oceanography and marine science. The Institute operates a research vessel docked in St. George and conducts research in effluent mariculture at Tallmans Island.

Kingsborough Community College in Brooklyn, also under the Board's jurisdiction, occupies a prime waterfront location but offers few related courses.

The State University operates the New York Maritime College at Fort Schuyler. Opened in 1874, the College offers officer training for the Merchant Marine, Coast Guard and Navy. Studies include marine science and transportation, nuclear science, oceanography and engineering. The College operates two vessels: the 533-foot Empire State, used for seagoing training, and the smaller S.S. Newport.

POLICE DEPARTMENT

The Police Department operates the Harbor Patrol Unit, which maintains seven boats in service at all times; five smaller boats are added during the summer. The Unit handled 4,000 boating incidents in 1973, including drownings, recovery of drifting vessels, towing of disabled vessels, and surveillance for narcotics and contraband.

The harbor precinct has 10 posts, seven of which are manned with large patrol boats. Others are covered by adjacent manned posts. Active posts have a shack and boat tie-up facility. They are either two or three-shift operations (eight-hour shifts). The Department maintains a launch repair yard at Randall's Island.

The Police Department uses several piers for storage, under the jurisdiction of the Department of Ports and Terminals. All have structural and fire violations and have been abandoned commercially. Piers 25, 34, and 54 are used by the Property Clerk office. Pier 34 is used for building maintenance and 54 for barrier storage. Piers 95 and 96 are used for the auto towaway program (parking violations). The Department also uses Rodman's Neck Rifle Range, a 54-acre site in the southern part of Pelham Bay Park, under the jurisdiction of the Parks Department.

FIRE DEPARTMENT

Marine bases are located all along the waterfront. Each is outfitted like a regular fire station, with sleeping quarters and eating facilities. Marine unit fire boats are stationed at several bases.

FEDERAL PROPERTIES

The Brooklyn Army Terminal, or Military Ocean Terminal, covers 96.4 acres in Bush Terminal. Created in 1919 to transport and supply U.S. forces in Europe, Congress declared it surplus in 1966. Its precise future is still in doubt. The military cargo operation (approximately 600 employees) has moved to New Jersey. The Army and Navy share the remaining military operation. Total estimated jobs at the Terminal are 1,200, with a payroll of about $15-million. The International Terminal Operating Co., one of the nation's largest marine cargo firms, is the only non-military tenant.

The pending vacancy of this complex presents a unique opportunity to add to the City's inventory of industrial space. The Terminal is considered one of the best planned and equipped supply bases in the world.

Re-use options depend on when the Federal government surrenders the property, to whom, and at what price. One possibility is to create a containership operation on landfill near the Terminal. However, given the containership capacity currently being developed in Brooklyn, it is unlikely that additional berths will be needed for some time.

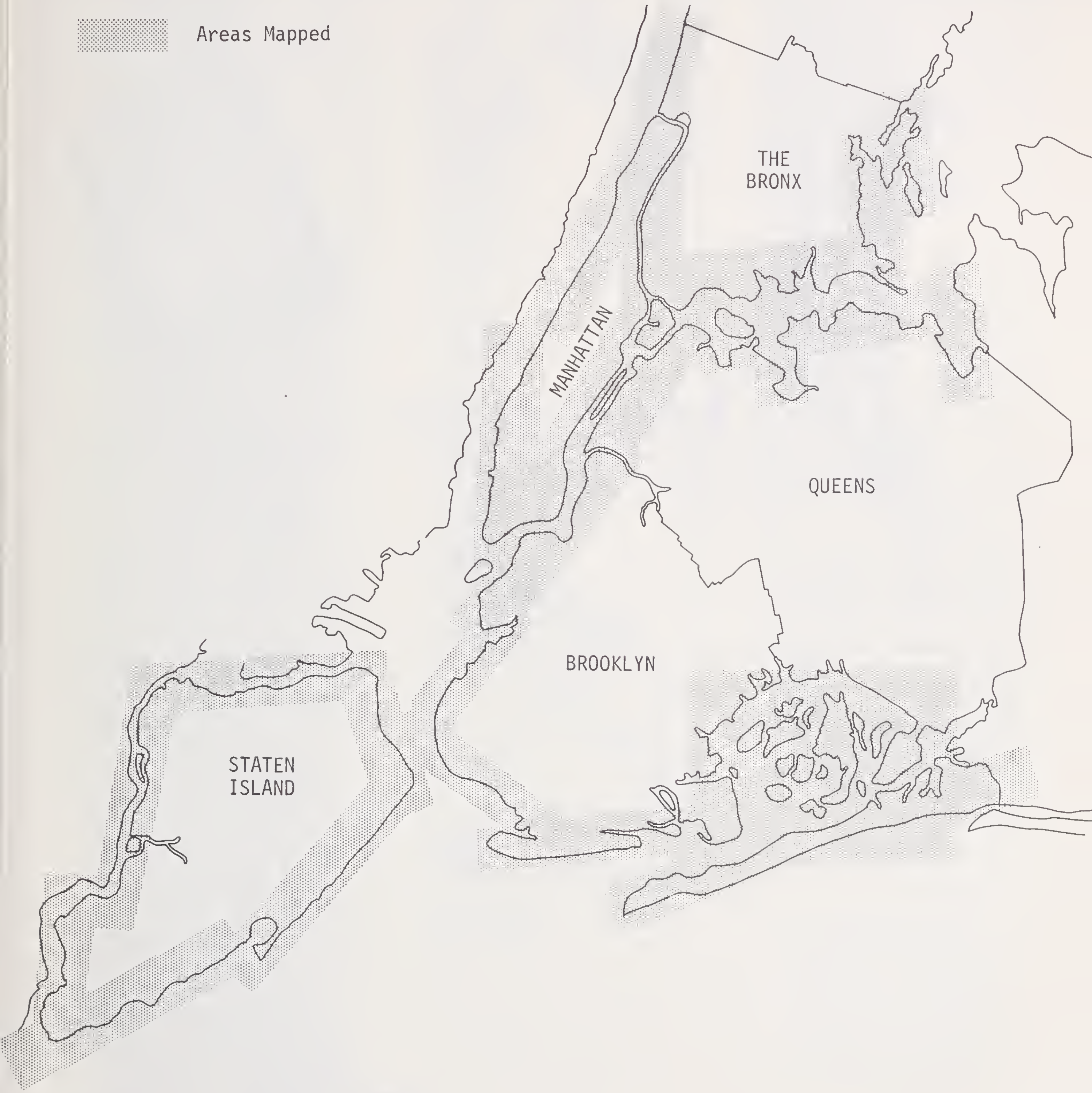
Forts Hamilton and Wadsworth

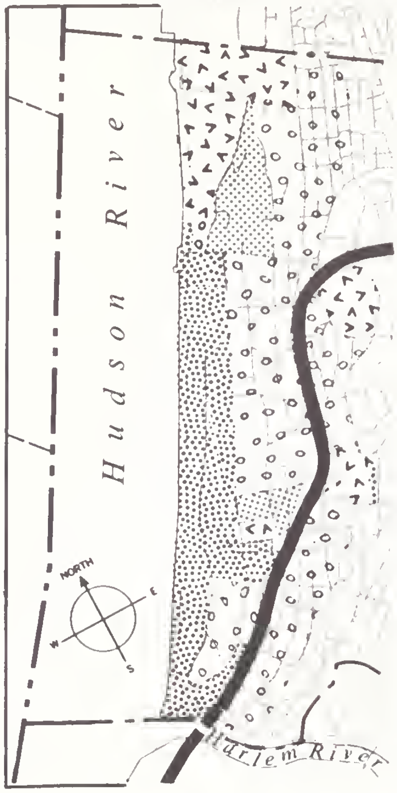
Fort Hamilton in Brooklyn and Fort Wadsworth on Staten Island are both located near the Verrazano Bridge, having been built to protect the Narrows. They are now administrative posts which provide limited military housing. Fort Hamilton includes a military chaplain training school and the V.A. Hospital. Certain portions of both Forts may be disposed of in the future. Fort Wadsworth may become a park and museum in Gateway National Park.

Fort Tilden, in Bayside, Queens, is 77th Army Reserve Command headquarters, and provides military housing. Built during the Civil War to protect the harbor, it resembles an old plantation. Fort Totten now houses the Coast Guard training school; part of the Coast Guard area has been loaned to Queensboro Community College. Some land at Fort Totten may become available, having already been declared surplus. The New York State Historic Trust completed a major study on specialized recreational use of the Fort.

The Fort Schuyler Merchant Marine base is located near the Whitestone Bridge in the Bronx. It is currently a naval reserve facility with two destroyers. The pier there was completed just two years ago, so the facility will probably not be phased out. The State University operates New York Maritime College at the Fort.

land use maps

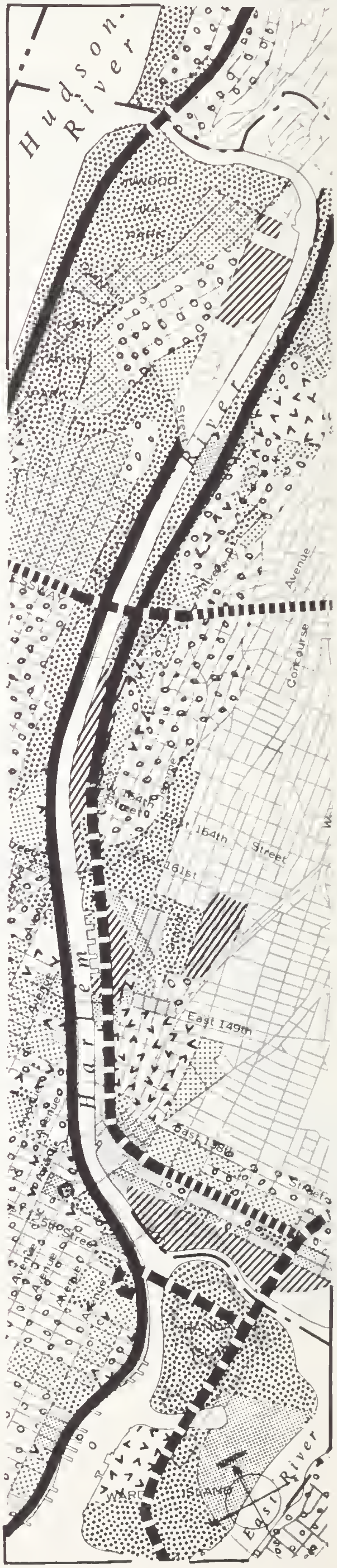




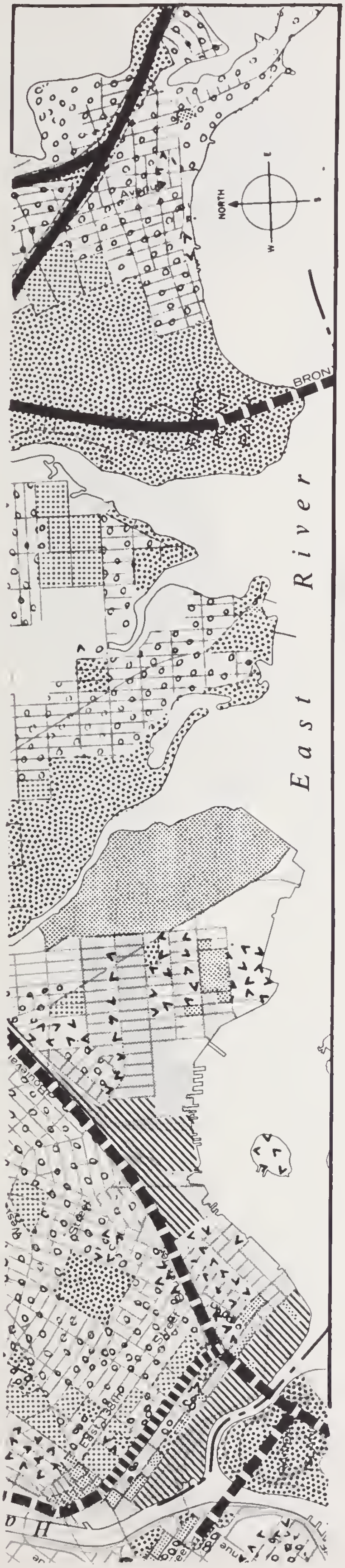
1 Hudson River from Westchester County Line to Harlem River
High bluff developed with low density housing and parks.

LEGEND

- ⁘ Low Density Housing
- ░ High Density Housing
- ▒ Parks
- ▨ Transportation
- ▒ Industrial
- ☐ Commercial
- ⁖ Institutional
- ☐ Vacant
- ▬ Highway, at grade
- ■■ Highway, elevated
- ▮▮▮▮ Highway, depressed
- •••• Highway, terraced

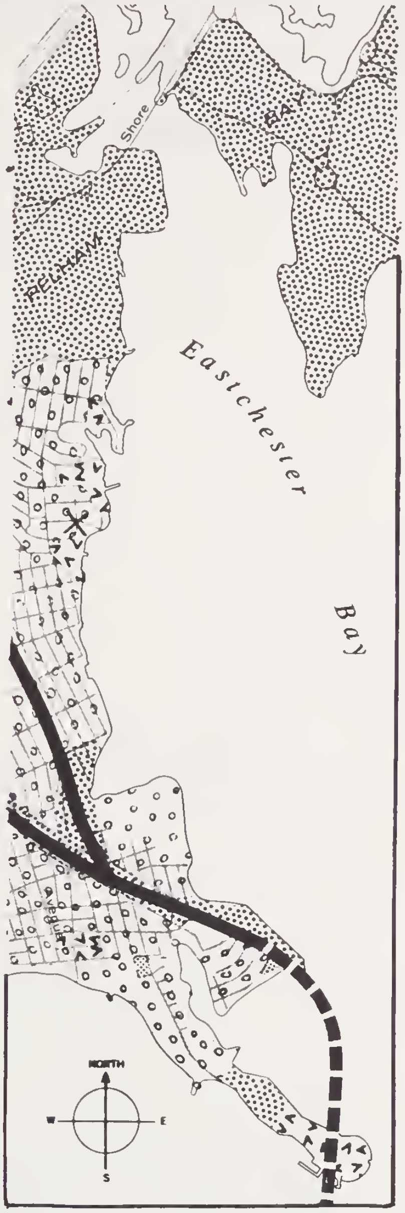


2 Harlem River
High bluffs on both sides of river, industrial development, highways, rail lines, and some housing.



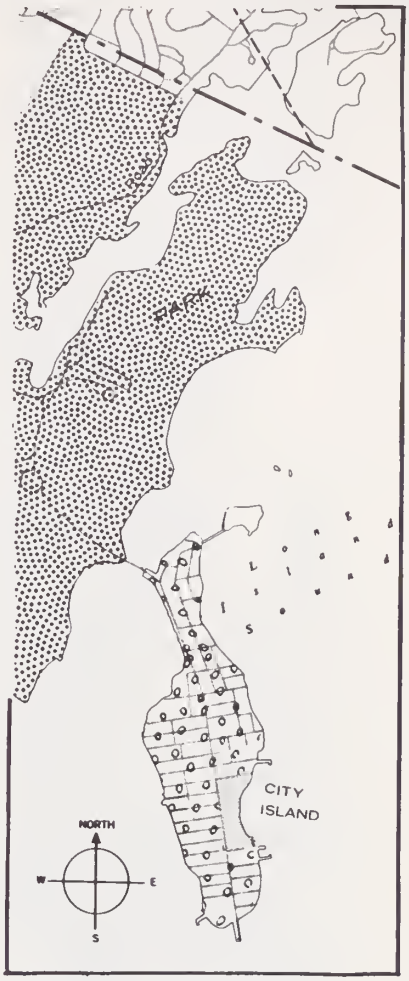
3 East River (North Section) from Harlem River to Throgs Neck Bridge

Industrial in Hunts Point, residential and vacant in Soundview, and parks.



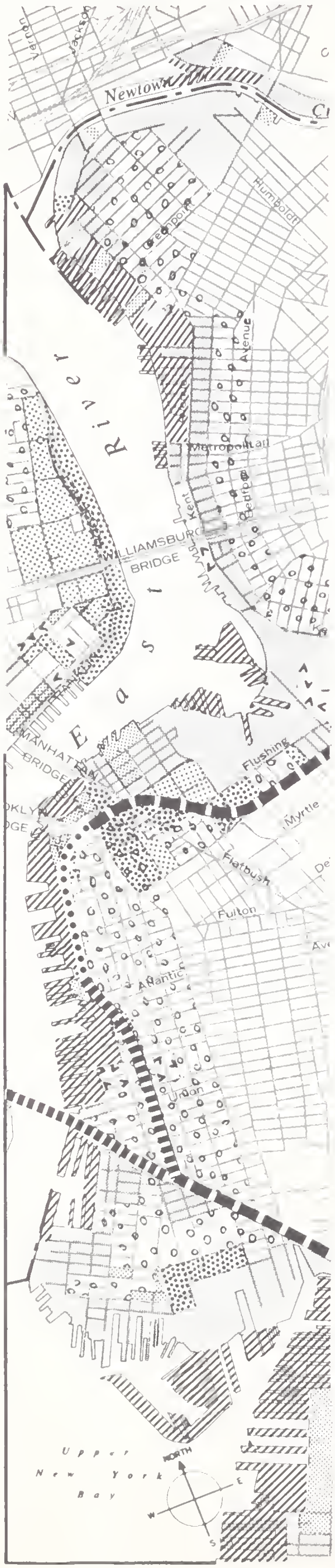
4 Eastchester Bay

Low density residential and parks.



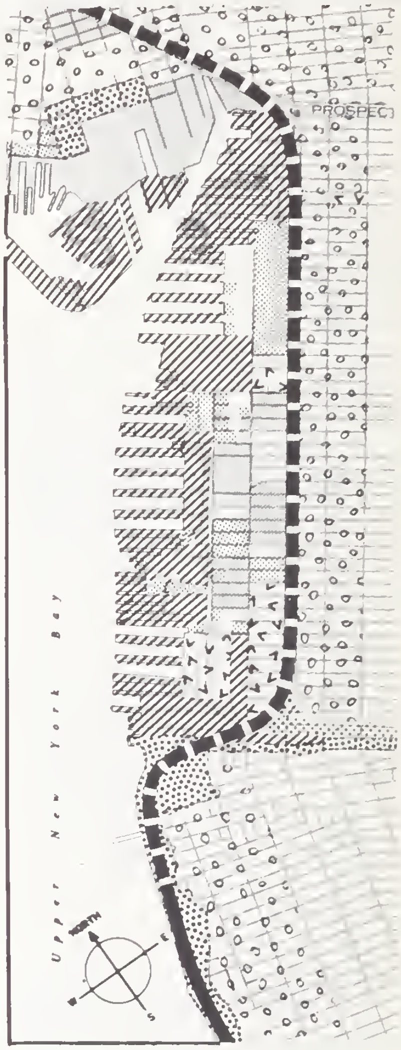
5 Long Island Sound

Low density housing and parks.



1 East River and Upper Bay

Piers and industrial

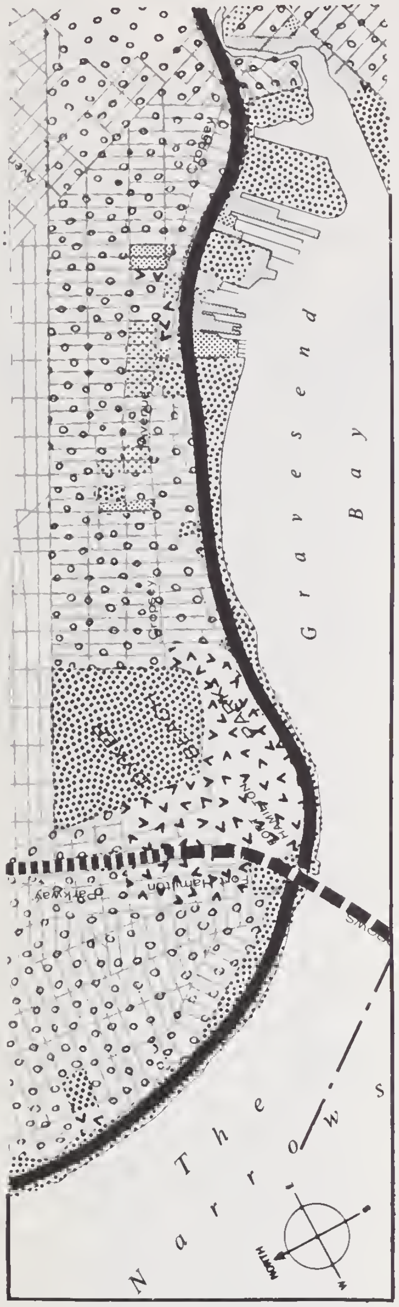


2

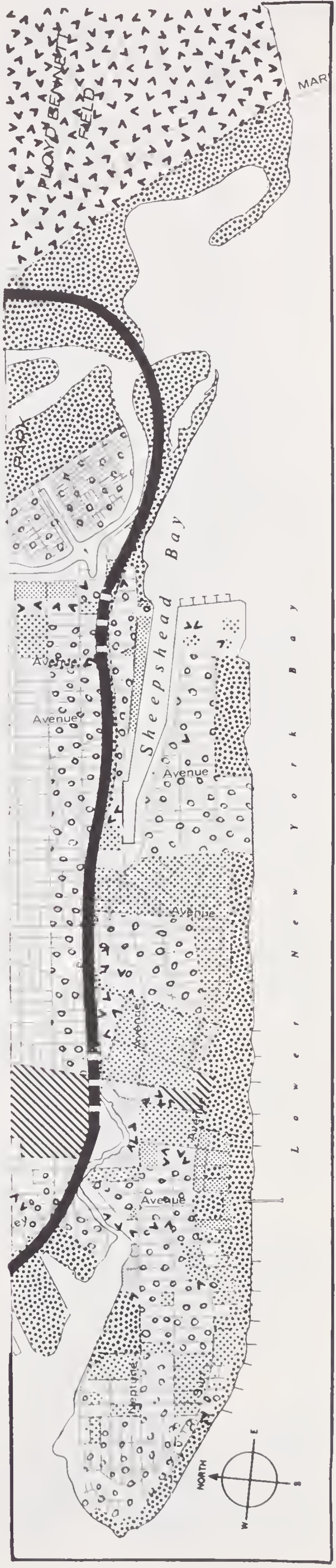
Upper New York Bay
Piers, industrial and parks

LEGEND

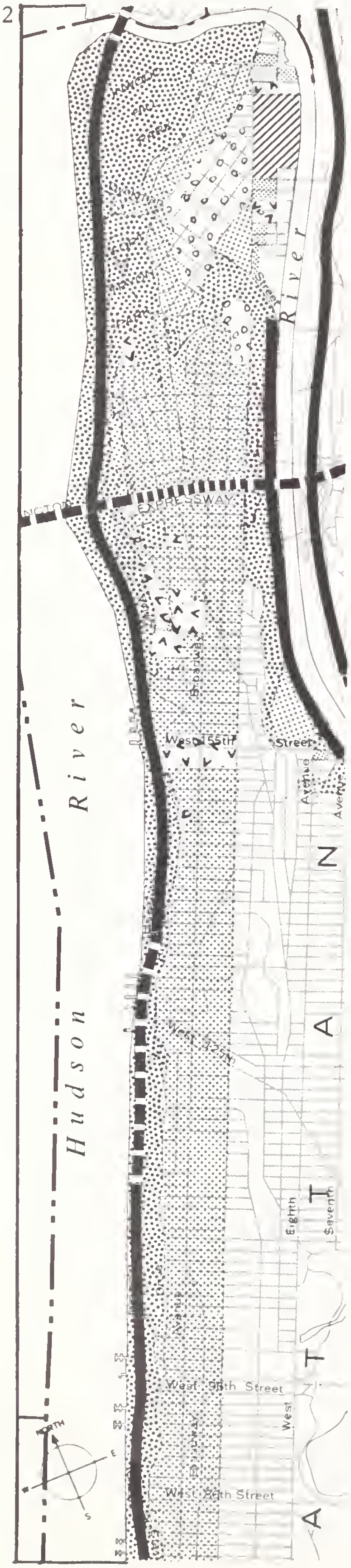
- ⁘ Low Density Housing
- ░ High Density Housing
- ▒ Parks
- ▨ Transportation
- ▓ Industrial
- □ Commercial
- ⁘ Institutional
- □ Vacant
- ▬ Highway, at grade
- ▪▪ Highway, elevated
- ▮▮▮▮ Highway, depressed
- •••• Highway, terraced



3 Upper New York Bay
The Narrows
Gravesend Bay
Parks and highways.



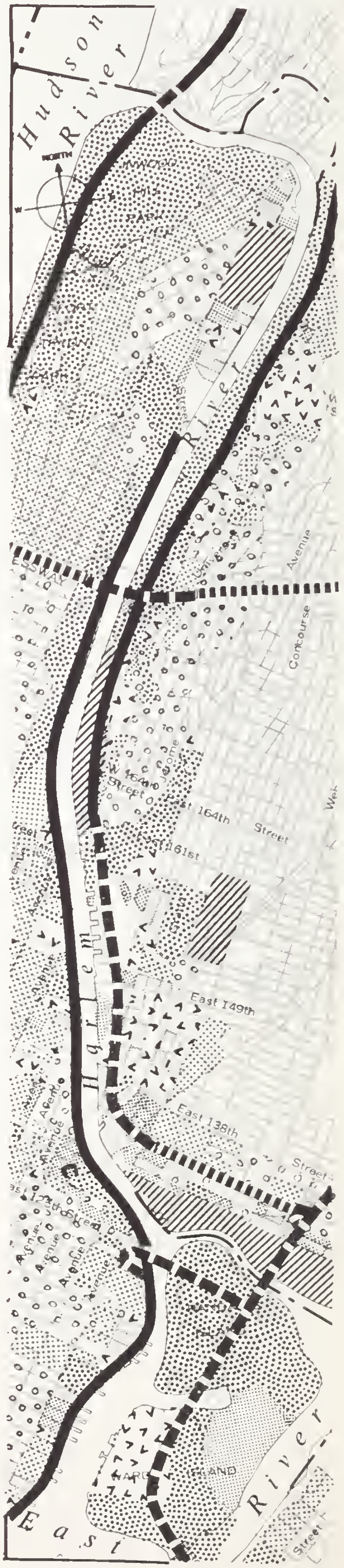
Lower New York Bay
Coney Island
4
Residential, beach, and
recreational areas.



1 Hudson River from Harlem River to midtown parks.

2 Harlem River

High bluffs on both sides of river, industrial development, highways, rail lines, and some housing.



LEGEND

- ⁘ Low Density Housing
- ░ High Density Housing
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- ▬ Highway, at grade
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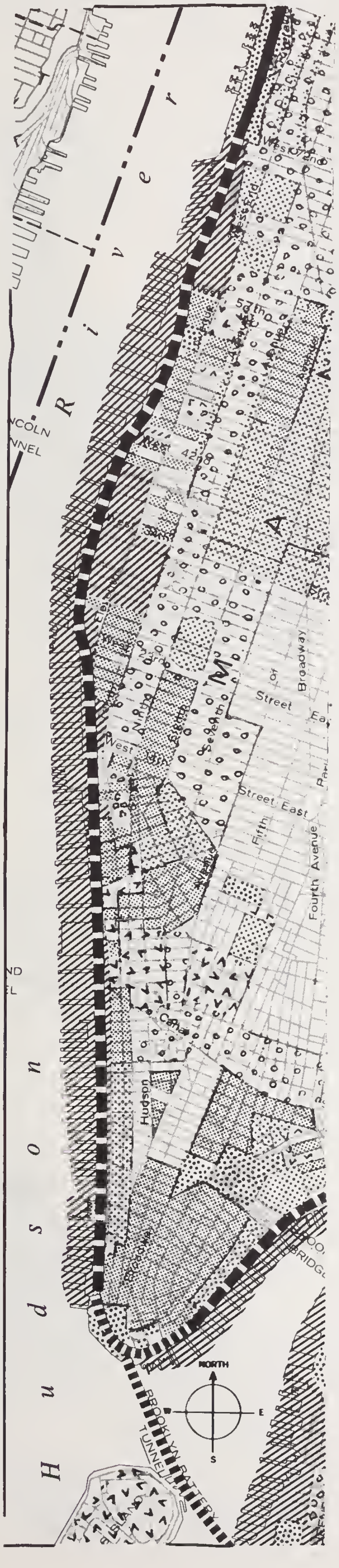


3

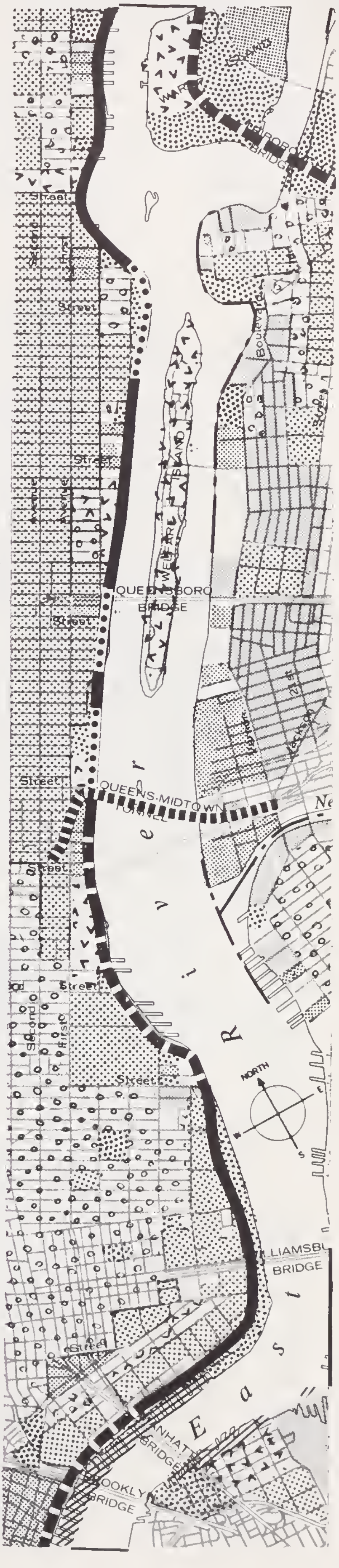
Hudson River from midtown to the Battery

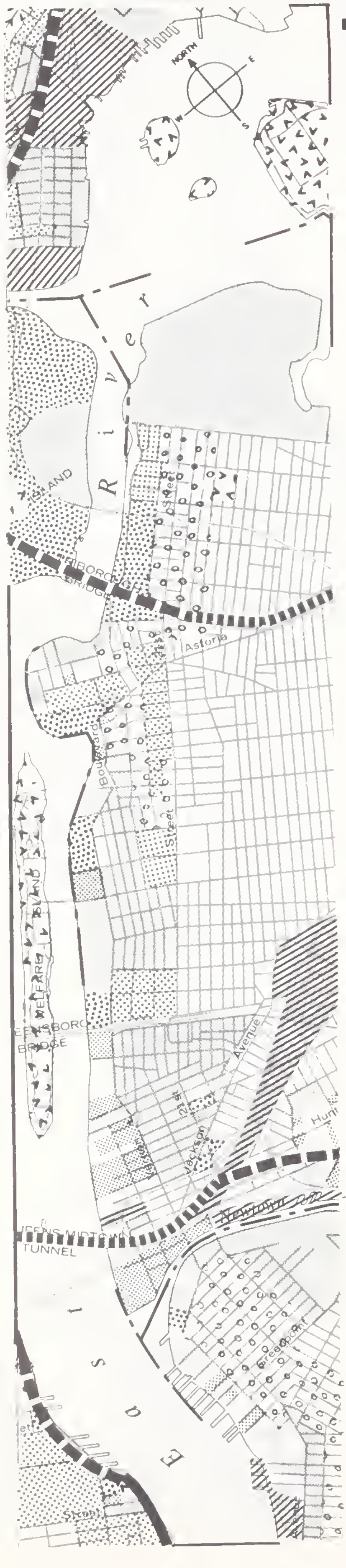
Freight and passenger piers, active and abandoned; highways.

4

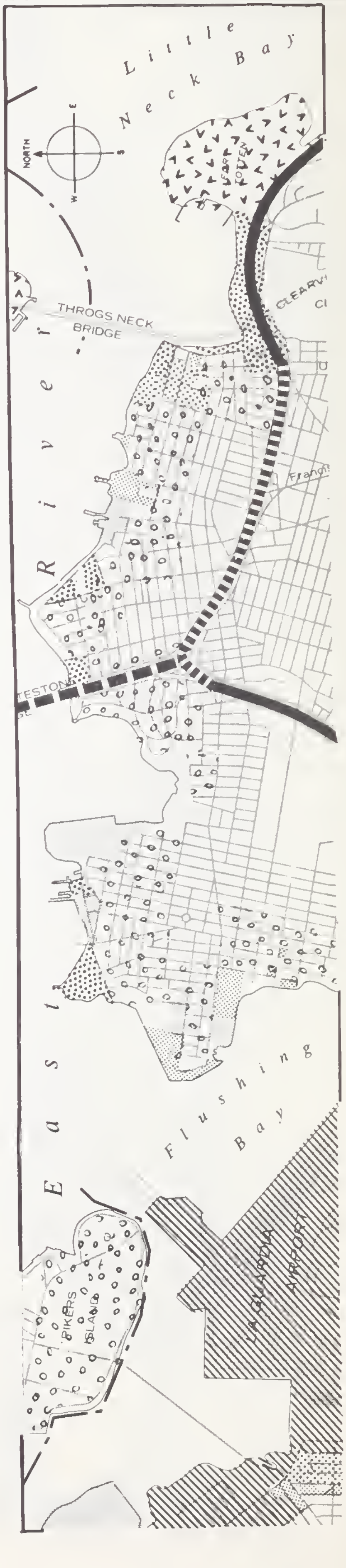
East River

High density housing, industrial, institutions and highways.

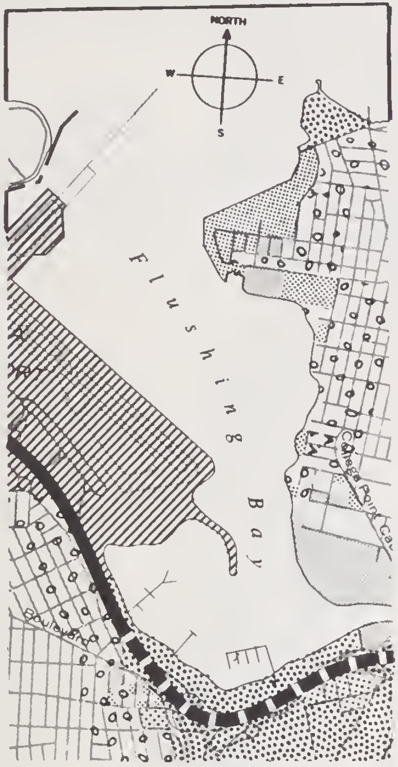




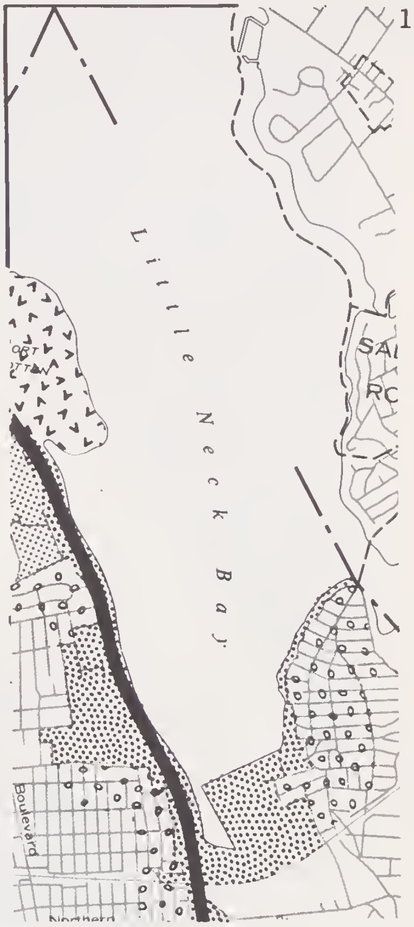
1 East River
Mixed industry, utilities,
and high density housing.



2 East River (North Section)
Airport, industry,
parks & housing.



3 Flushing Bay
Airport, industrial uses,
and parks



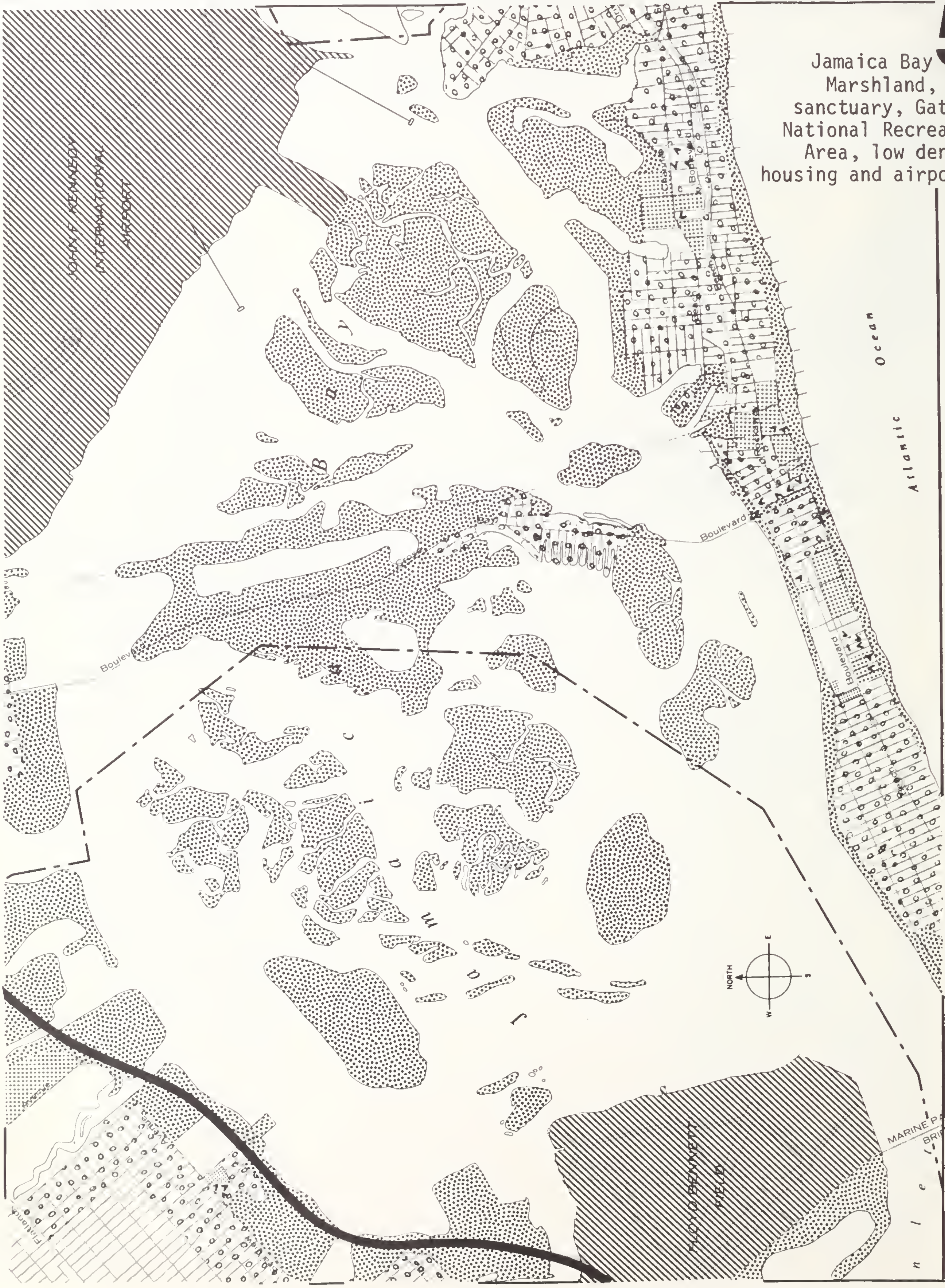
4 Little Neck Bay
Parks and housing.

LEGEND

- ∘ Low Density Housing
- ░ High Density Housing
- ▒ Parks
- ▨ Transportation
- ░ Industrial
- ☐ Commercial
- ⁂ Institutional
- ☐ Vacant
- ━ Highway, at grade
- ▬▬ Highway, elevated
- ▮▮▮▮ Highway, depressed
- •••• Highway, terraced

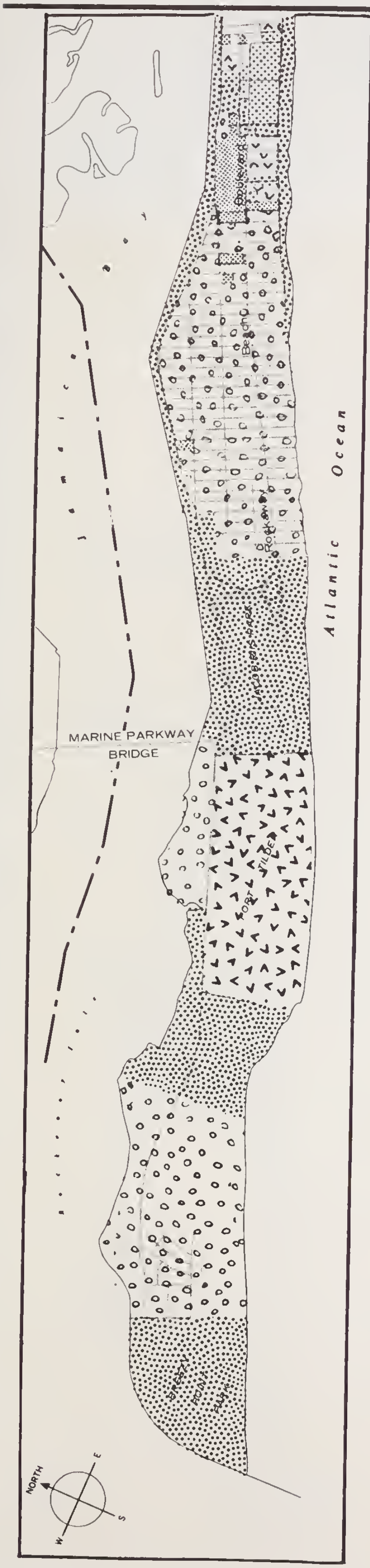
5

Jamaica Bay
Marshland, bird
sanctuary, Gateway
National Recreation
Area, low density
housing and airports.



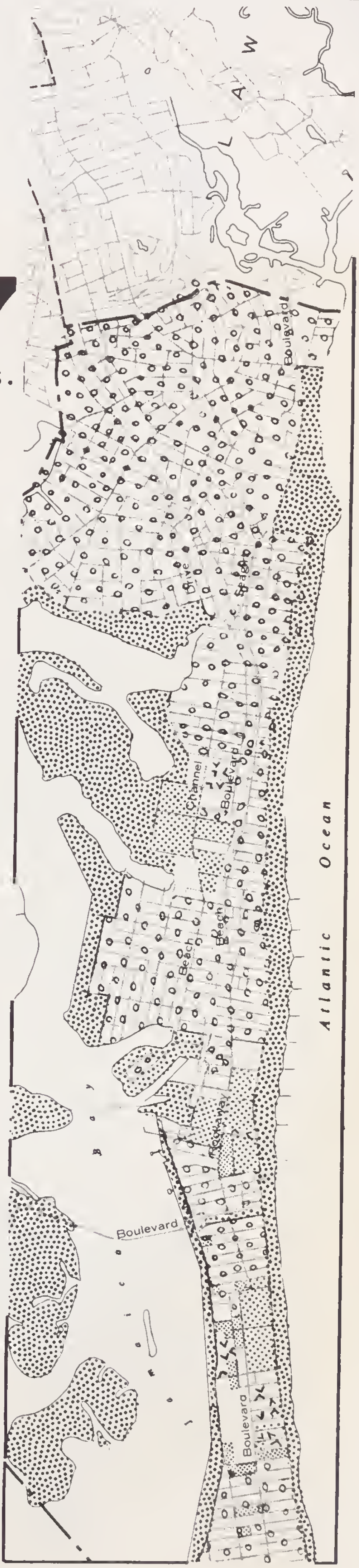
6 The Rockaways (Western Section)

Housing, parks, and beaches.



7 The Rockaways (Eastern Section)

Housing, parks, and beaches.



LEGEND

- ⁘ Low Density Housing
- ░ High Density Housing
- ▒ Parks
- ▨ Transportation
- ▓ Industrial
- ☐ Commercial
- ⌃ Institutional
- ☐ Vacant
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- ▬ ▬ Highway, elevated
- ▮▮▮▮ Highway, depressed
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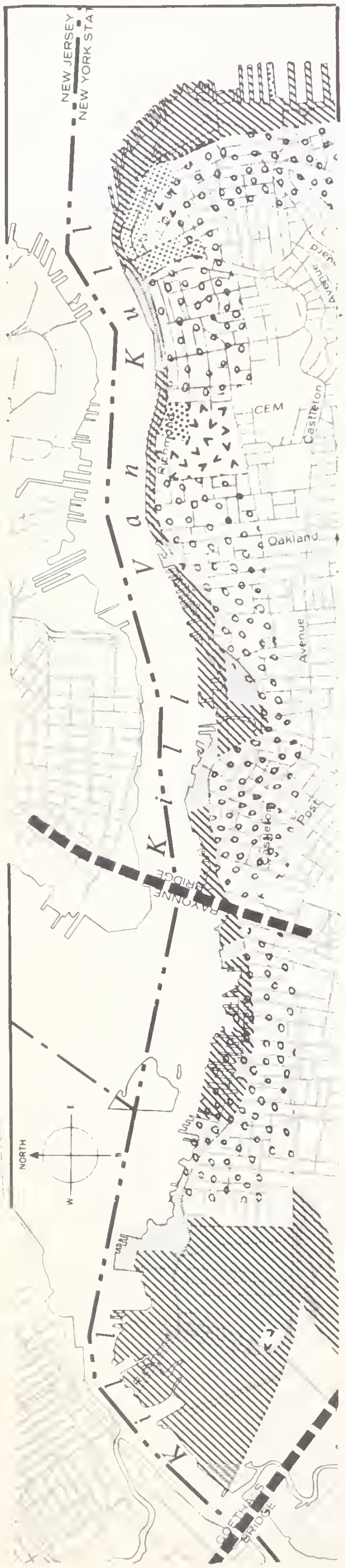

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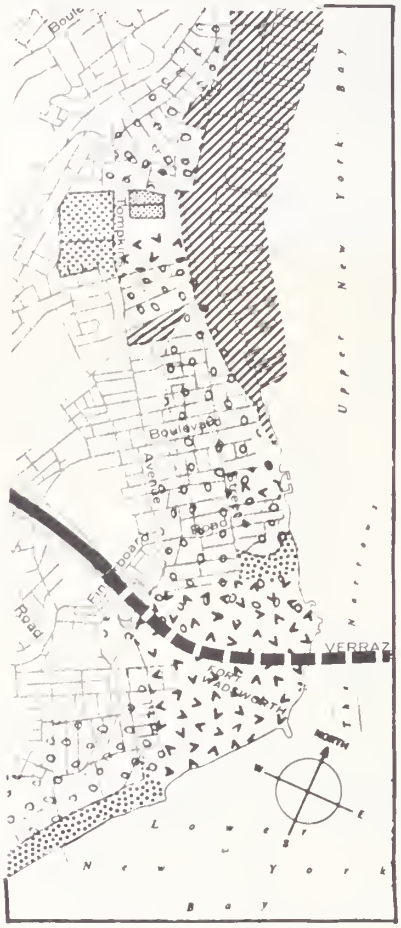

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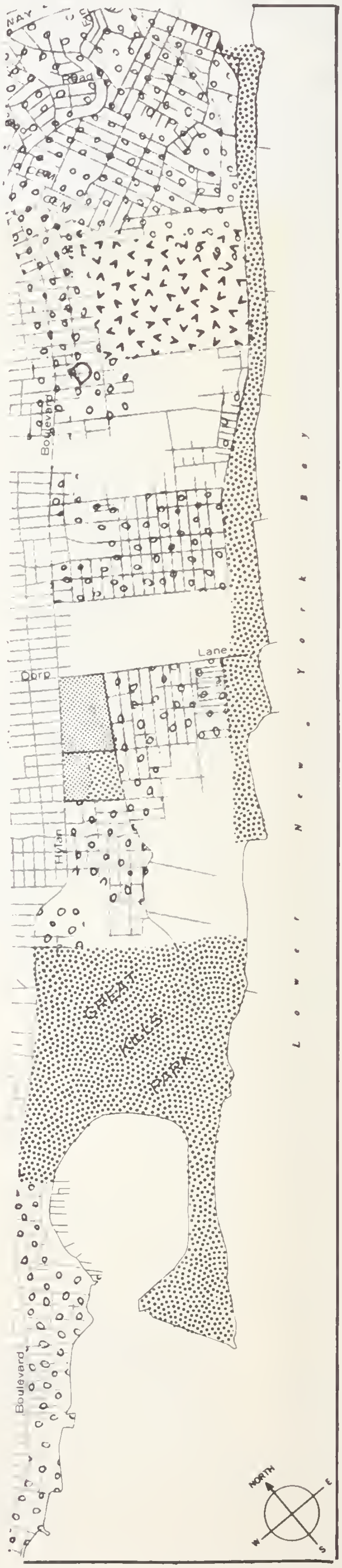


3

1 Kill Van Kull
Industry at the shoreline, housing on the highland overlooking the water.

2 The Narrows
Industry, housing, and institutions.

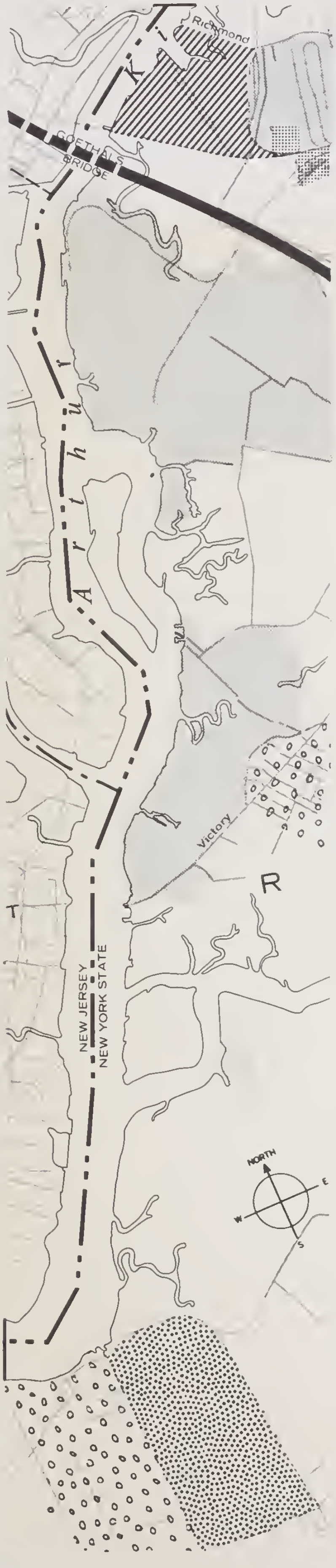
3 Lower New York Bay
Beaches and parklands.

4 Arthur Kill (Upper Section)
Industrial, landfill sites, and vacant areas.

5 Arthur Kill (Lower Section)
Industrial, institutional, low density housing, and vacant.

6 Lower New York & Raritan Bay
Low density residential, institutional, and vacant.

4



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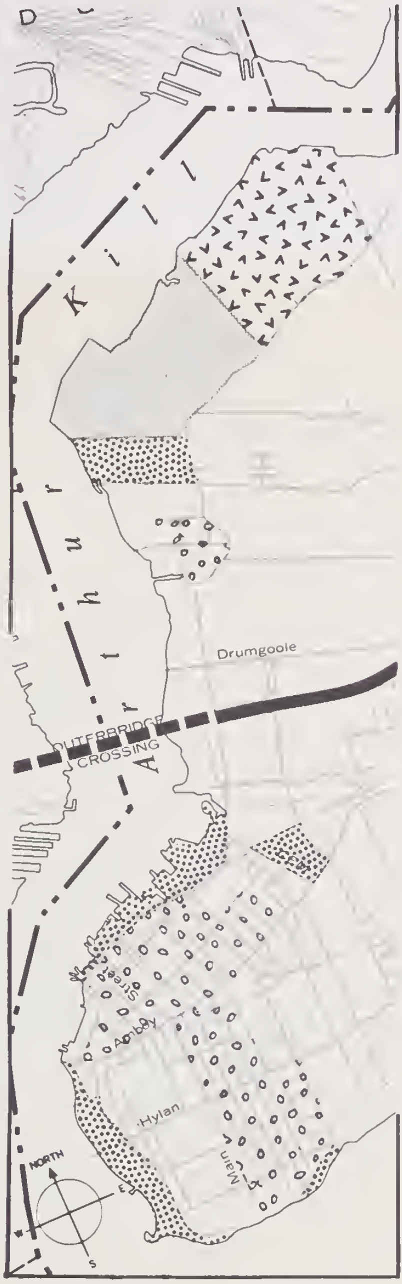

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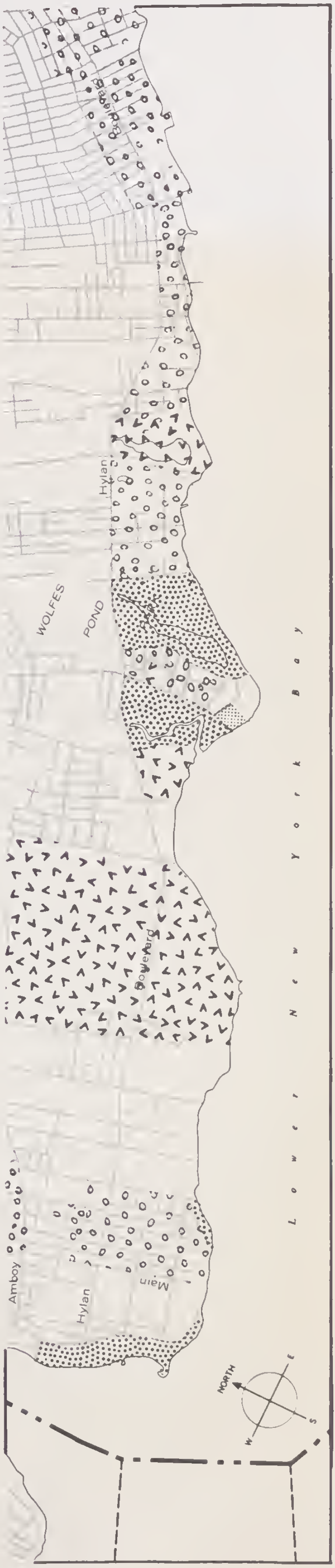

LEGEND

- ⁘ Low Density Housing
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- ⁙ Parks
- ▨ Transportation
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